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22 October 1985

USSR REPORT
LIFE SCIENCES
BIOMEDICAL AND BEHAVIORAL SCIENCES

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AEROSPACE AND MEDICINE

AVIATION INDUSTRY CLINIC FOR MEDICAL EXAMINATION OF TEST PILOTS

Moscow MEDITSINSKAYA GAZETA in Russian 16 Aug 85 p 4

DVIGANTSEV, S.

[Abstract] The article salutes, on the occasion of USSR Air Fleet Day, the work of the central polyclinic of the Ministry of the Aviation Industry. The clinic's chief physician, Anzhela Mikhaylovna Saratovskaya, Daina Il'inichna Krechmer, a physician in the department of functional diagnosis, and other personnel are quoted in regard to medical examination procedures and equipment that are in use here.

It is said that all of the country's test-flight personnel must come to the central polyclinic for annual examinations. A commission of experts headed by Aleksandr Yerofeyevich Khavkin is in charge of the examinations. Stanislav Pavlovich Tseshkovskiy, a member of the commission and a meritorious physician of the RSFSR, is quoted about vision-testing methods which the clinic's ophthalmology office has developed. Associates of the laboratory headed by Svetlana Petrovna Moskaleva are said to be using 20 different methods in their work. Moskaleva showed the author of the article some of this laboratory's diagnostic equipment, including an automatic biochemical analyzer for enzyme studies. This unit is said to be capable of processing data from 33 samples in 15 minutes.

FTD/SNAP

CSO: 1840/2078

AGROTECHNOLOGY

UDC 547.963.3

EXPRESSION REGULATION OF STRUCTURAL GENES DURING WHEAT VERNALIZATION

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 283, No 2, Jul 85 (manuscript received 28 Mar 85) pp 506-508

DASKALYUK, A. O. and LOBOV, V. P., Institute of Plant Physiology, UkSSR Academy of Sciences, Kiev

[Abstract] An attempt was made to determine qualitative and quantitative differences in genome expression of vernalized and non-vernalized plants using hexaploid wheat Mironovskaya 808 variety (winter wheat) (I) and Mironovskaya spring wheat (II). It was shown that vernalization changes the genome expression in wheat. In the nonvernalized I wheat sprouts, 22,800 mRNA molecules with 1,300 nucleotide length were expressed. The same sequences were seen in I and II after 30 and 60 days of vernalization. However, as a result of vernalization, 2,600 and 3,400 new mRNA molecules appeared in the polysomes of I and II respectively. Most of the new mRNA in II occurred during the first 30 days of vernalization; in I this happened between the 30 and 60th day of vernalization process. Figure 1; references 9: 2 Russian, 7 Western (1 by Russian author).
[1989-7813]

GENETIC AND CELLULAR ENGINEERING IN PLANTS

Moscow PRAVDA in Russian 8 Jul 85 p 7

SYTNIK, K., academician, Ukrainian SSR Academy of Sciences; director, Institute of Botany imeni N. Kholodnyy, Ukrainian SSR Academy of Sciences

[Abstract] Plants present rather unique problems and difficulties when it comes to genetic and cellular engineering, but lately both aspects of molecular biology have gained a foothold in botany. Genetic engineering has been largely applied to improving the photosynthetic apparatus of plant cells and their resistance to a variety of diseases. Cellular engineering has a longer history, and is particularly well developed in the USSR. The latter approach uses somatic cells to create hybrids by cell fusion and transfer of organelles from one cell to another, and has found extensive application in agriculture in terms

of breeding practices. Interspecies hybrids have now been obtained between tobacco, cabbage, potatoes, tomatoes and so forth, and their wild counterparts. In addition, cellular engineering has also made it possible to manipulate cytoplasmic genes. The impact of such manipulation on plant breeding practices can be expected to be great.

[381-12172]

BIOCHEMISTRY

NEW BACTERIAL ENZYME BENEFICIAL TO LIVESTOCK PRODUCTION

Moscow IZVESTIYA in Russian 25 Jul 85 p 1

[Article by M. Bayzhanov, IZVESTIYA special correspondent, Kazakh SSR:
"Miracle Bacteria"]

[Text] Production of dry bacteria enzymes has begun at a Turkestan food antibiotics plant. This new production is intended for the ensilage of practically all types of coarse fodders; it improves their quality and extends their storage life.

"Retsept" is a highly effective compound developed by scientists at the Institute of Microbiology and Virology of the Kazakh SSR Academy of Sciences. It is prepared from lactic acid bacteria cultures and when it is introduced to a food mass at designated doses it increases its nutrient properties.

Republic stock breeders have evaluated the merits of the bacterial enzymes, which promote increased yields, weight gains and wool shearings.

12262
CSO: 1840/1976

UDC 577.152.6

STRUCTURAL AND ANTIGENIC DIFFERENCES OF PANCREATIC RNA-ase PREPARATIONS
MODIFIED WITH DEXTRAN ESTERS BY AZOCOMBINATION METHOD

Moscow BIOKHIMIYA in Russian Vol 50, No 4, Apr 85 (manuscript received
4 Jun 84) pp 581-587

KURINENKO, B. M., KASHKIN, A. P., KALACHEVA, N. V., MERINGOVA, L. F. and
NEKHOROSHKOVA, Z. M., Kazan State University imeni V. I. Ul'yanov-Lenin;
All-Union Scientific Research Technologic Institute of Antibiotics and
Enzymes for Medicinal Purposes, Leningrad

[Abstract] Enzymes have been used as biologically active drugs, but one very serious problem with them is their antigenicity which limits their use in medicine. To improve their effectiveness, enzymes have been modified to lower their immunogenic and allergenic properties. A hypothesis was tested that, depending on the molecular weight of the modifier and on the functional groups binding the protein to a carrier, modifications of the enzyme could be achieved with desired antigenic differences; this was tested on pancreatic RNA-ase (polyribonucleotide of 2'-onigonucleotide transferase). Dextran-modified pancreatic RNA-ase derivatives were obtained; their UV spectra and aminoacid composition showed differences in the sites of enzyme binding to the polymeric matrix relating to primary, secondary and even tertiary structure of the enzyme. This modification was reflected by differences in antigenic properties of the protein. One could selectively choose a number of binding sites of the enzyme to the support matrix which would neutralize the antigen-stimulating effect of the support, resulting from the screening of protein antigenic determinants. Figures 5; references 14: 12 Russian, 2 Western (1 by Russian authors).
[1995-7813]

UDC 547.458.1+577.15.062

PARTIAL PURIFICATION OF POLYMERASE FROM O-SPECIFIC POLYSACCHARIDE SALMONELLA ANATUM

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 283, No 2, Jul 85 (manuscript received 4 Feb 85) pp 480-482

KALINCHUK, N. A., DRUZHININA, T. N. and SHIBAYEV, V. N., Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences, Moscow

[Abstract] Biosynthesis of O-specific polysaccharide of *S. anatum* consisting of trisaccharide mannosyl-ramnosyl-galactosyl chains occurs by the normal mechanism. Enzymatic polymerization of oligosaccharide links of synthetic and semisynthetic polyprenylpyrophosphatooligosaccharides appears to be the final stage of the synthetic method developed by the authors for the production of normal and modified O-specific polysaccharide chains of salmonella. It was shown that under conditions of enzymatic polymerization of the exogenic substrate of trisaccharide derivative of moraprenyl pyrophosphate, the principal reaction product is the polysaccharide O-hepten. As the result of this work, it was possible to obtain purified *S. anatum* polymerase preparation. Using the latter preparation it was possible to synthesize O-specific polysaccharides. Figure 1; references 7: 2 Russian, 5 Western.
[1989-7813]

UDC 577.31+577.15.051

IMMOBILIZATION OF AZOTOBACTER VINELANDII IN POLYACRYLAMIDE GEL

Tbilisi SOOBSHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian Vol 117, No 2, Feb 85 (manuscript received 2 Sep 83) pp 405-408

CHITANAVA, E. G. and NUTSUBIDZE, N. N., corresponding member, Georgian SSR Academy of Sciences, Institute of Biochemistry, Georgian SSR Academy of Sciences

[Abstract] Immobilization of *Azotobacter vinelandii* in 10% polyacrylamide gel at 4°C resulted in a preparation of immobilized cells retaining 2/3rds of the nitrogenase activity of native cells. However, the immobilized cells retained their activity for 8 days as opposed to 70 hours for reinoculated native cells, showing much greater productivity per equivalent biomass. Optimal polymerization conditions are described since individual components of the system exert a toxic effect on the cells. Figures 2; references 7: 4 Russian, 3 Western.
[1992-12172]

INCREASE OF SELECTIVITY OF ACTION OF PROTEOLYTIC ENZYMES, COVALENTLY IMMOBILIZED IN POLYMERIC HYDROGEL MATRIX

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 282, No 4, Jun 85 (manuscript received 23 Jan 85) pp 1010-1013

PLATE, N. A., corresponding member, USSR Academy of Sciences, CHUPOV, V.V., VALUYEV, L.I. and BURDYGINA, I.F., Moscow State University imeni M.V. Lomonosov

[Abstract] Study of the possibility of creating preparations capable of selective action on one of the components of complex biological mixtures of chemically-close-related substances by developing preparations for selective hydrolysis of 1 protein in a mixture with others by use of a proteolytic enzyme is described and discussed. Trypsin and heparin, human serum albumin and fibrinogen were used in the study and the binding capacity of immobilized ligands was determined by the quantity of protein absorbed. Study of hydrolysis of fibrinogen and serum albumin by trypsin, immobilized in polyacrylamide gel, showed the rate of hydrolysis of both proteins to be the same in this case, i.e., there is no selectivity of effect of immobilized trypsin for any one of the proteins. Study of the relationship of the number of products of hydrolysis to the time of contact of the fibrinogen hydrolysis solution with binary hydrogel containing covalently immobilized heparin and trypsin shows that the binary gel breaks down the protein substrate more actively than single-component, trypsin-containing hydrogel, i.e., immobilized trypsin can lyse fibrinogen hydrolysis in the solution. Presence of immobilized heparin in the same polymer matrix accelerates this process by increasing local concentration of the substrate in the reaction zone. Binary hydrogel is more than 2.5-fold more active with regard to fibrinogen hydrolysis than with regard to human albumin. It was assumed that simultaneous introduction of a specific ligand into the hydrogel and a non-specific enzyme makes it possible to increase the selectivity of action of the latter, which regulates the selectivity of action of 1 of the components of complex mixtures, present in solutions. Figures 4; references 10: 6 Russian, 4 Western. [1960-2791]

UDC 577.154.33

EVOLUTION OF ENZYME-SUBSTRATE INTERACTIONS DURING ENZYMIC DEGRADATION OF CELLULOSE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 282, No 4, Jun 85 (manuscript received 4 Jan 85) pp 1013-1017

RABINOVICH, M.L., MELNIK, M.S., BADALOV, A.B., KLESOV, A.A. and BEREZIN, I.V., corresponding member, USSR Academy of Sciences Institute of Biochemistry imeni A.N. Bakh, USSR Academy of Sciences, Moscow

[Abstract] Parallel series of experiments (3), carried out to obtain data concerning evolution of enzyme-substrate interaction and the structure of a

cellulose surface during the enzymic reaction, employed a method of study of heterogeneous enzymic reactions based on the shift of position of adsorption quasi-equilibrium being established in an enzyme-insoluble substrate system upon addition of a stained insoluble substrate to the reaction mixtures. In 2 experiments, the microcrystalline cellulose was hydrolyzed by an adsorbed enzyme for 2 hours up to several days and, in the 3d, control experiment, cellulose was incubated under identical conditions, in a buffer solution without the enzyme. The picture of enzymic hydrolysis obtained included a rapid state, involving hydrolysis of amorphous sections of the cellulose surface with formation of a "smooth" crystalline surface accompanied, simultaneously, by acceleration of enzymic transport among the cellulose particles. Multiple repetition of adsorption and desorption acts decreases mobility of the adsorbed enzymes, possibly due to partial "spreading" of the enzyme globule along the "smooth" surface of the substrate, which indicates that enzyme transport among the cellulose particles reduces the rate of reaction. This "spreading" process probably is accompanied by partial inactivation of the adsorbed enzyme. Figures 2; references 4: 1 Russian, 3 Western.
[1960-2791]

UDC 577.112.5:578.841

AMINO ACID SEQUENCE OF GRANULIN PEPTIDE FRAGMENTS OF CUTWORM (AGROTIS SEGETUM)-INFECTING GRANULOSIS VIRUS

Kiev BIOPOLIMERY I KLETKA in Russian Vol 1, No 3, May-Jun 85 (manuscript received 26 Dec 84) pp 158-159

KOZLOV, E.A., LEVITINA, T.L., RODNIN, N.V., KHARCHENKO, V.M. and SEREBRYANYI, S.B., Institute of Molecular Biology and Genetics, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] An analysis was conducted on the amino acid sequence of proteolytic fragments of granulin resulting from treatment with trypsin or chymotrypsin. Granulin was isolated from the inclusion bodies formed in the cutworm (*Agrotis segetum*) infected with the granulosis virus. Comparison of the peptide fragments obtained with both enzymes resulted in the identification of 26 unique peptides containing from 2 to 29 amino acids, representing 91% of the granulin chain (27500 MW). References 5 (Russian).
[2041-12172]

UDC 577.322:578.841

PHYSICAL CHEMICAL CHARACTERISTICS OF INCLUSION BODY PROTEINS OF CUTWORM-
INFECTING NUCLEAR POLYHEDROSIS AND GRANULOSIS VIRUSES

Kiev BIOPOLIMERY I KLETKA in Russian Vol 1, No 3, May-Jun 85 (manuscript
received 14 Aug 84) pp 121-124

KOZLOV, E.A., LEVITINA, T.L., GUSAK, N.M. and SEREBRYANY, S.B.,
Institute of Molecular Biology and Genetics, Ukrainian SSR Academy of Sciences,
Kiev

[Abstract] Comparative studies were conducted on the protein components of inclusion bodies of cutworm (*Agrotis segetum*)-infecting nuclear polyhedrosis and granulosis viruses, representing baculoviruses of potential use as biological insecticides. Standard techniques led to the isolation of the nuclear polyhedrosis protein (polyhedrin) and the granulosis virus protein (granulin). Dodecyl sulfate polyacrylamide gel electrophoresis of both proteins demonstrated that polyhedrin had a MW of 28000, while that of granulin was determined to be 27500. Combination of standard protein chemistry and the dansylation method showed that glycine and methionine represented the N-terminal amino acids of polyhedrin and granulin, respectively. In addition, granulin was found to differ from the polyhedrin under discussion more than polyhedrins differ among themselves in amino acid composition. The most significant differences between granulin and nuclear polyhedrosis virus polyhedrin involved four to five more asp, glu and val moieties in the latter protein. Figures 2; references 22: 10 Russian, 12 Western.
[2041-12172]

BIOPHYSICS

BIOLOGICAL COMPUTERS

Moscow MOSCOW NEWS in English No 29, 28 Jul-4 Aug 85 p 10

[Interview titled "Biological Computers Now?" conducted by Natalya SHAPOVA]

[Text] The world press has of late been reporting more and more often about development of biological microdevices for use as transducers, processors and working elements. New firms have sprung up aspiring to produce technical biosystems--biocomputers. Below, Corresponding Member of the USSR Academy of Sciences Genrikh IVANITSKIY, director of the USSR Institute of Biological Physics, talks about the work in this field now under way in the USSR.

What computer units and parts can be biologized? Since biological devices are capable of transforming energy of different kinds, including chemical, mechanical, light and electric, nearly all the main assemblies of the computer can be switched on to biological lines.

Supersensitive transducers serve as the source of input information in a biological computer. They are able to respond to diverse substances with utmost sensitivity by picking off literally single molecules in a medium.

Such biotransducers are composed of protein and enzymes attached to a special kind of base made of paper, polystyrene, nylon, glass or metal, which makes them easy and convenient to handle. Even colonies of microorganisms can be joined on to these carriers.

A Protein Molecule as Computer Sensor

The research done at the Institute has demonstrated that globular protein molecules can be considered based on a number of their indices, as solid bodies whose mechanical characteristics are equal to those of acrylic plastics or ebonite, the only difference being that a protein molecule is a structure with elasticity varying in different directions. Bearing this in mind one can design what can be termed chemomechanical transducers.

Assume that certain chemical substances to be discovered and analyzed have started to arrive at the computer "input" sensing the development of some technological process. The transducer is to detect their concentration and

give a definite signal. Attached to the carrier immobilized protein molecules pick up the molecules or atoms of other substances and, as a result, they change their dimensions by either expanding or compressing, which makes it easy to register them. Then the transducer returns to its initial position.

Autowaves: Key to Fast Response

The mystery of data processing takes place in the processor, the brain of the computer, where information is once more analyzed, transformed and synthesized. What are the prospects for biologizing this unit? The speed of response achieved in a neuron net computer is not more than 10^2 operations a second, while that of microprocessors now in use is well over 10^6 . Not before long we expect new high-speed computers to appear performing more than 10^9 operations per second and over 10^{12} operations per second by the beginning of the next century.

And yet, given certain conditions, i.e., transition to the molecular level of biocomputer organization, the molecular biocomputer is quite able to compete with the digital computer. One of the ways to achieve this is to make use of autowave processes:

The analog of autowave reaction was discovered by the Soviet scientist Belousov in 1956. A. Zhabotinskiy and A. Zaikin created in 1970 a chemically active medium, enabling them to see an autowave chemical processor in action, a thin lifelike layer of solution kept changing its color at regular intervals.

Autowave oscillations are around us and are to be found in the transfer of data in a living organism, contraction of the cardiac muscle, in the initial stages of morphogenesis in some simple organisms, the processes of promoting catalysts as well as in many other phenomena.

Let's assume that an autowave is moving in the medium of, say, a protein molecule the length of 30-50 angstroms, one angstrom being equal to 10^{-10} m, at a speed of 0.1 mm/s, though autowaves can travel at an even higher speed. Calculated in terms of a digital computer, a device like this will perform 10^6 operations per second. If protein molecules are fastened onto a film, a tiny piece of it, just 1 cm² square, may contain more than 10^{12} active molecules. By guiding a flat wave along such a film one can achieve 10^{12} changeovers per second--an enviable speed.

Thousands of Books on a Disc

Now a few words about the computer memory. It has been found that dehydrated bacteriorhodopsin "stays put" at a certain stage of the photochemical cycle, retaining the image recorded, which allows it to be used as a photographic carrier. The supersensitivity and resolving power of these protein molecules make them a good choice for use as photographic recording material.

They can easily crystallize into a film with a lattice spacing of about 40 angstroms, each molecule changing its color under the influence of a laser beam. Films like this are reusable for images can be recorded on them and erased from them, hardly any different from microelements of the optical memory.

The Institute of Biophysics succeeded in producing such a film for the first time in 1978. By 1982 it had been improved, and a new photocarrier obtained. There was now every indication that unique storage devices could be designed on the basis of materials having such a high resolving power (just one single molecule changes its color) and in combination with laser technology, providing fast data recording and erasing. 10^{14} bits of information per cubic centimeter (a fantastic figure!) is the limit for the memory capacity of such devices. This means that the texts of several dozens of thousands of books can be recorded on a disc consisting of such a photocarrier and having the size of an LP. Research of this kind should be considered a practical beginning in the use of biological data recorders for technology.

Biocomputers are just taking their first steps. But by all accounts in some 10-15 years they'll be playing an appreciable role in science and engineering.

CSO: 1840/2061

UDC 577.332.425+577.323.427

NATURE OF STACKING CAFFEINE MOLECULES IN WATER: STUDY BY MONTE-CARLO METHOD

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 282, No 4, Jun 85 (manuscript received 28 Jan 85) pp 1000-1003

SHESTOPALOVA, A.V., DANILOV, V.I. and MALEYEV, V. Ya., Institute of Radio Physics and Electronics, UkSSR Academy of Sciences, Kharkov; Institute of Molecular Biology and Genetics, UkSSR Academy of Sciences, Kiev

[Abstract] Study of hydration of a caffeine monomer and its dimer by the Monte-Carlo method was carried out to reveal factors which promote association of caffeine molecules and stabilization of caffeine stacked dimers. The number of water molecules in the system studied was $N=200$. Calculations were performed in a cluster approximation for $T=298^{\circ}\text{K}$. The temperature of caffeine hydration was found to be 22.0 kcal/mole. The study of caffeine hydration showed that introduction into the water cluster of any 2 of its forms causes strong mechanical breakdown of the structure of the water. Association of monomer forms of the caffeine molecule creates a structure of the water around the stack which has lower energy than the structure of water around the monomers. This is the basic cause of stacking of caffeine in water. Figure 1; references 11: 3 Russian, 8 Western.
[1960-2791]

UDC 577.352.38

EFFECTS OF SYNTHETIC ANTIOXIDANTS ON LIPID STRUCTURE AND COMPOSITION IN BIOLOGICAL MEMBRANES AND INFORMATION TRANSFER AT CELL LEVEL

Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 2, No 6, Jun 85 (manuscript received 12 Nov 84) pp 557-565

BURLAKOVA, Ye.B. and KHOKHLOV, A.P., Institute of Chemical Physics, USSR Academy of Sciences, Moscow

[Abstract] Studies were conducted on the effects exerted by synthetic antioxidants on various hepatic and brain (synaptosomes) membranes of SHK mice, intraperitoneally injected with 30 mg/kg of 4-methyl-2,6-di-tert-butylphenol, 150-180 mg/kg of 6-methyl-2-ethyl-3-hydroxypyridine, or 30 mg/kg

of 4-oxy-3,5-di-ter-butyl-alpha-benzylamine. Changes in the lipid phase were monitored by EPR signals obtained from spin-labeled lipids, which demonstrated that, within 1-3 h of antioxidant injection, viscosity of the membrane lipids increased, followed in ca. 10 h by a decrease in viscosity. The initial change in viscosity induced by the antioxidants was interpreted as reflecting an enhanced effectiveness of action, i.e., a trigger mechanism, while the second phase of decreased viscosity was ascribed to feedback control correction. The effects seen were directly correlated with concentration and antioxidant effectiveness. Viscosity was found to be directly related to the total concentration of readily oxidizable lipids, phosphatidylserine and phosphatidylinositol. An increase in the membrane concentration of these lipids was correlated with an increase in viscosity, and vice versa. Since membrane function, including that of various receptors, is highly dependent on membrane structural parameters, the antioxidants can be presumed to exert a significant effect on cellular response to various signal molecules, such as hormones. Figures 4; references 19: 14 Russian, 5 Western.

[2040-12172]

BIOTECHNOLOGY

MOSCOW TELEVISION PROGRAM ON BIOTECHNOLOGY

[Editorial Report] In Moscow Moscow Television Service in Russian 26 Aug 85 the "Science and Life" Program of 26 August deals with the role of biotechnology in solving livestock breeding problems and includes the following: shots of livestock, poultry at farms, production of microorganisms in laboratory; shots of work on microbiological strains at laboratories at All-Union Scientific Research Institute of Genetics and Selection, including amino acids lysine, threonine, interview with institute's director V. G. Debabov on use of threonine as additive to livestock fodder; shots of laboratory production of strain of homoserine [sic], which has replaced food yeasts in production of lysine, and production of riboflavin; interview with institute's deputy director A. I. Stepanov on riboflavin production; shots of experimental apparatus at All-Union Scientific Research Institute of Biosynthesis of protein substances for production of protein concentrate from natural gas; shots of plant for production of food yeasts from petroleum; interview with Protein Biosynthesis Institute's Deputy director N. V. Gradova on laboratory for study of protein components on microbiological synthesis products; shots of laboratory and interview with V.I. Orlovskiy, deputy director of All-Union Scientific Research Institute of Biotechnology, on production of antibiotics for livestock; program interspersed with commentary by V. I. Ogarkov, deputy of the main administration of the microbiological industry and of the USSR Council of Ministers and corresponding member of the USSR Academy of Medical Sciences.

CSO: 1840/2076

ACADEMICIAN CALLS FOR SOVIET BIOTECHNOLOGY DEVELOPMENT

Moscow PRAVDA in Russian 22 Jul 85 p 3

[Article by Yu. Ovchinnikov, Vice-President of the USSR Academy of Sciences, in the column "In the Land of the Soviets": "At the Boundaries of Biotechnology; The Horizons of Science"]

[Text] Currently, man is paying more and more attention to the field of biology and this, naturally, is not accidental. The conservation and efficient use of the environment worry all of us. But the main reason for the increased interest in the world of living nature lies in the aggravation of the food problem and in the striving of man to eliminate dangerous diseases and illnesses.

The direction of biology, which is related to knowledge of the elementary mechanisms of vital activity, is progressing especially energetically today. It has been determined that in the living cell, large and small molecules predominate, and it all functions, in the final analysis, according to the laws of chemistry. If we speak figuratively, the cell is a miniature chemical plant which works with colossal productivity, with boundary coordination and according to a given program. Hundreds of very complex compounds, including gigantic biopolymers, primarily proteins, are synthesized in it continually, and all "by-products" are utilized completely according to the requirements for growth and development. The program of the activity of the cell, and also of the whole multicellular organism, is encoded in nucleic acid molecules in the form of a sequence of definite chemical units--this also is hereditary information which is transmitted by means of these structures from generation to generation.

The revolutionary character of events taking place in biology lies in the fact that it appears to be completely practicable now to control cell processes, although only for the simplest systems. Scientists have learned to make cells synthetically with the requisite characteristics for microbiological synthesis, have successfully begun experiments on the fusion of cells of higher organisms for the purpose of obtaining new cell hybrids, and have found conditions for growing cells of plants, animals and even man outside the organism on synthetic media. Furthermore, methods have been developed for rearrangement of the genetic apparatus, the production of synthetic genes and their incorporation back into the cell, and on this basis, hundreds of new very small organisms unknown in

nature, but bearing properties needed by man, have been obtained in laboratories. All this also determined the birth of genetic and cell engineering as the principally new direction of biological science, which today rightly stands in the same rank as atomic fission, overcoming the earth's gravitation and invention of electronic devices.

Namely, genetic and cell engineering in conjunction with microbiological synthesis, by extensive use of the methods of biochemistry and bioorganic chemistry, is also basic new biotechnology, which in a short time has turned into one of the powerful branches of industry. Today it occupies leading positions in world scientific-technical progress beside machine-building, energy, electronics and chemistry. The world market for biotechnological production, most of all in the field of agriculture and medicine, according to the forecasts of specialists, as early as the middle of the 1990's, will reach levels of 130-150 billion rubles. Now this field, at rapid rates which are greater than that of electronics, is developing in many countries, and it is included as one of the important component parts in the Complex Program of Scientific-Technical Progress of Comecon countries for the period up to the year 2000.

If from this point of view one shifts to an evaluation of the level of biotechnology in the USSR and the tasks for its further development, first of all it should be noted that measures taken by the CPSU Central Committee, our administrators and the USSR Academy of Sciences for strengthening new directions of basic biology permitted over the last decade, to a considerable degree, the elimination of delay which had been noted in this field in the post-war period. The leading academic institutes, major medical centers and our best higher institutes of learning now reached world boundaries from the level of many biological studies conducted by them.

It is impossible not to acknowledge what has been achieved. But at the same time, it should be said in all clarity that upon the whole in the USSR, the level and scales of biotechnological developments do not satisfy the requirement of the times. Modern biotechnology is the basis of scientific-technical progress in agriculture and in medicine, and therefore has strategic value for the development of the national economy. Consequently, we need to take immediate measures for its intensive development and in particular from these positions examine both achievements and shortcomings.

The microbiological industry is developing in the Soviet Union at an appreciable rate. It is based on Soviet scientific research efforts, and the USSR Academy of Sciences made a heavy contribution here. On this basis we obtain almost 1.5 million tons of feed protein and we occupy the leading place in the world. However, our requirements up to now have not been completely satisfied. Therefore, it is necessary to broaden the raw material base. In particular, it is extremely desirable to convert more rapidly to the use of petroleum paraffins, natural gas, lower alcohols, methanol and also wastes of the forest industry and agriculture as the raw material.

The microbiology industry also has other tasks. It is necessary to expand microbiological production of essential amino acids and other physiologically active compounds. As a positive example, one can mention the producer of the amino

acid threonine, which is made at the Glavmikrobioprom by the genetic engineering method. The expansion of the production of new generations of antibiotics for medicine and animal husbandry, and also enzymes, vitamins, growth stimulants, pesticides, etc. is extremely urgent for the USSR.

Today, one of the cell problems of biotechnology is the production by the methods of cell and genetic engineering of high-quality varieties of agricultural crops which are resistant to adverse environmental factors and different diseases. Indeed, the traditional method of selection is long-drawn-out, in many respects empirical and ordinarily solves the problem of productivity but not of resistance. Cell engineering today must become the main line in the selection of agricultural crops, and this trend has already been determined in many countries. Finally, this work requires great skill and a corresponding technical base, but the answer appears to be substantially more rapid and the efficiency considerably higher. Until now, we have had only a few laboratories in Moscow, the Ukraine and Belorussia with plant biotechnology methods; in this way, the first varieties have already been obtained, but these approaches should be adopted everywhere and as soon as possible.

Biotechnological approaches are rapidly expanding also into the world of animals. Not only are the transplantation of zygotes and the implantation of embryos at the establishment of the breeding stage already commonplace, but also the wide use of synthetic vaccines in cattle-breeding practice.

The achievements of biotechnology drastically expanded the possibilities of modern medicine. In particular, natural regulators of the human organism have become practicable for medical practice, which previously could have only been dreamed of. Last year in the USSR, a universal antiviral agent--human interferon--was obtained by means of genetic engineering by specialists of the Academy of Sciences and Glavmikrobioprom; it is now being subjected to the final step of medical tests. Research studies have been completed on the development of an analogous method for the production of insulin, which is necessary for treatment of diabetes, and also the human growth hormone. On the agenda are the newest natural preparations for the stimulation of immunity, the most important proteins of blood, including those preventing thrombosis, etc. The methods of biotechnology are widely used for obtaining different vaccines.

The leading academic and medical centers possess many of these modern techniques. But their adoption into practice is extremely complex, because our medical industry up to now has been separate from modern requirements for their methodical and material basis. To accelerate scientific-technical progress here vitally, it is necessary, and in the most rapid way--to organize the experimental production of the leading scientific institutes, which possess both methods of obtaining modern preparations and the proper sophistication of production.

It is certain that the value of biotechnology for medical practice will steadily grow, including the development of the newest approaches for treating cardiovascular and oncological diseases and immune and nervous system diseases.

Biotechnology has already been used more and more successfully not only for medical and agricultural purposes. It is used in the food industry, in particular

for the production of sugar from starch and cellulose, and millions of tons of sugar are produced in the world by this method. Biotechnology is essential for the development of sewage works; it is used for extraction of valuable metals from ores and industrial wastes, for increasing the petroleum recovery from strata, and for obtaining fuels, in particular alcohol and fuel gas. It is not ruled out that tomorrow efficient energy plants, powerful information complexes, and survival systems in inaccessible regions, etc., will be developed based on it.

This is in the future. And today we need to provide all possible acceleration of scientific-technical progress in the field of biotechnology, and in the shortest period of time put it into the service of our national economy and not allow delay here in any case.

The maintenance of a high level of basic biological science in this country is the main condition. The task of scientists is to provide at the same time a great practical direction of developments, including those in academic institutes. In our biology, in which many people work, extremely abstract studies still predominate not infrequently, in which one or another biological process is measured for many years lengthwise and crosswise without any practical results. At the same time, frequently the level of genetic studies and work in the field of cell biology, immunology, not even to mention biotechnology itself, is at the bottom.

It appears necessary to improve the system of training and retraining of personnel for new specialties in biology. It is not correct that in many universities and agricultural and medical institutes of higher learning, teaching of genetics, immunology, bioorganic chemistry, which are the bases of biotechnology is lacking.

The problem of strengthening and modernizing the base of the leading biological institutes, most of all in Moscow, near Moscow and in Leningrad is also extremely urgent today. Problems exist in providing scientific institutions with equipment and reagents and also laboratory animals of pure strains.

Intensification of work in new directions of biology and biotechnology in the field of agriculture and medicine now acquires critical urgency. In this connection, it would appear, in particular, proper to build modern biotechnological centers in the basic agricultural regions of the country. Naturally, such centers can be organized also at existing institutes, with a maximum economy of energy and time, but according to the character of their activity, they must become interdisciplinary, providing a high level and rapid growth of biotechnological studies upon the whole in the oblast, kray and republic. The USSR Academy of Sciences, the republic academies, the Academy of Agricultural Sciences imeni V. I. Lenin and local party and Soviet organizations must take upon themselves the responsibility for the organization and activity of such centers.

Modern biology and biotechnology occupy a special position among other directions of scientific-technical progress. Their achievements have not only great economic but also important social value, while specifically directed toward the satisfaction of the needs of man.

HYBRID CELL PRODUCTION IN USSR

Moscow TASS in Russian, 24 Jul 85

[Text] Soviet biologists have succeeded in fusing yeast cells with animal cells so that the resultant unusual cells with two and sometimes more nuclei and merged protoplasm have lived for about a month in laboratory conditions.

Fused cells usually die within 24 hours, but the scientists are confident that their cells have kept living and functioning for just as long as they have been able to watch the processes of interaction between the ingredients of such cells that have a single membrane each.

It is the first time that genetic engineers have managed to produce cells from such evolutionary distant components as a microbial cell and an animal cell.

According to one of the experimentors, Valentina Borodina of the Institute of Molecular Biology of the USSR Academy of Sciences, such cells are not yet hybrids since they have different kinds of nuclei and cannot reproduce.

The scientists look at such cells as a model for studying the finest processes of interaction between elements that are evolutionarily far apart. The studies are important to solving the problem of tissue compatibility and breeding new varieties of agricultural crops.

The problem of cell reconstruction from individual molecules has long held the interest of researchers who are now making just the first steps to cracking it. But they have already been able to use the method to investigate the structure of many genes of plants, bacteria and animals. Such medicinal preparations as insulin, somatotropin and interferon are commercial produced from bacteria with in-built heterologous genes responsible for heredity. Plant selectionists have also been able to produce the interspecific hybrids of cultivated tobacco, potatoes, tomatoes and cabbage with their wild-growing kin.

CSO: 1840/2001

DEVELOPMENTS IN BIOTECHNOLOGY

Moscow TASS in English 16 Aug 85

[Text] The most revolutionary changes in the life of mankind which is entering the third millenium will be in biology. This is the opening remark made by Academician Yuriy Ovchinnikov, a biologist of world renoun, vice-president of the Academy of Sciences of the USSR, in an interview with a TASS correspondent.

At present, he went on to say, that very moment has come in our study of living matter when we all can hope for a solid payback on the accumulated capital of fundamental knowledge. Generally speaking, the task now is at least to double the payback of that branch of knowledge, even within the next five years, and to make it an efficient and stable source of well-being of mankind. The same efficient and stable source, as, say, nuclear power industry which was born out of the fundamental ideas of physics, or cosmonautics to which many sciences contributed their discoveries.

Asked about the vast potential accumulated by Soviet biology, Academician Ovchinnikov first of all singled out those branches of that science which provided the basis for the large-scale operation of the microbiological sector of Soviet industry. The use of microorganisms, both natural and man-made, as raw materials on an industrial scale, as well as the use of different enzymes and methods of gene engineering in production processes, places microbiology among the modern industries employing the most efficient scientifically-substantiated technologies. There is a bountiful opportunity to use virtually unlimited resources of renewable raw materials (waste of agricultural production, microorganisms, nitrogen contained in the air, etc.), to create near-perfect conditions of work for man and minimize environmental pollution.

The Soviet microbiological industry today is a hard-working sector of production which supplies agriculture, the food industry and medicine, with protein, enzymes and efficient drugs. Yuriy Ovchinnikov went on to say that the processes of their production are based on the latest achievements of Soviet biological science.

"As to myself," Academician Ovchinnikov said, "I am not inclined to share the views of some pessimists who, because of some isolated negative cases involving delays in the use of scientific achievements in practice, are generally pessimistic about our ability to reach the world's highest standards in biology and other sciences. Incidentally, people of ill-will abroad use such ideas in their

self-serving aims. We have accumulated vast experience in comprehensive solution of both fundamental and applied problems in biology. Let us recall the way we successfully carried out such programs, as revertase, interferon, insulin, immobilized enzymes and other projects which became efficient means for boosting important sectors of agricultural production and public health services. What is especially impressive today is agriculture-related projects of biotechnology covering a wide range of problems--from raising the output of protein with the use of microbiological methods to sharply reducing the time needed for the selection of productive varieties of plants and animal species.

"And still," Academician Ovchinnikov stressed, "the present-day pace of growth--I would say, the 'escalation of biotechnology' in the life of man--can no longer satisfy us. The list of urgent organizational problems discussed at the meeting of the Politbureau of the Central Committee of the CPSU, is the need to orient all specialists working in biotechnology--scientists, engineers and technicians--toward the development of a well-gearred system which would make it possible to receive a tangible economic effect from new fundamental projects carried out by biologists.

"At present one can, ever more frequently, hear experts in different countries say that the food problem which is growing more acute on this planet with each passing year can be dependably resolved only with the help of biotechnology. This," the prominent Soviet biologist said, "gives our efforts an international, global character, raises the interest of the world public, especially in the developing countries of Africa, Asia and Latin America, in those efforts. It is appropriate to remind those politicians who are now trying to dodge the new Soviet peace initiative--the moratorium on nuclear explosions--of the daily cares of millions of people who have trouble feeding their children. The cost of every new nuclear test is equal to the cost of construction of several protein-producing plants."

CSO: 1840/2031

SUPPLY OF COMPLETE PROTEIN FOR ADEQUATE NUTRITION IN USSR

Moscow KRASNAYA ZVEZDA in Russian 13 Jul 85 p 3

[Abstract] This article entitled "Protein Storehouses" presents a discussion of Valentina Frantsevna Bekere, doctor of biological sciences and director of a group of specialists at the LaSSR Academy of Sciences Institute of Biology, laboratory of the Animal Biochemistry and Physiology, of the pressing need to provide adequate amounts of complete protein to ensure a nourishing diet for the Soviet peoples. The amount of food protein available in the USSR is near the level required but the amount of complete protein of animal origin (especially meat, milk and eggs) in the Soviet peoples' diet should be increased. This calls for increased production in animal husbandry and radical improvement of fodder production. These two factors are directly related since protein shortages in fodders reaches 25-30 percent and there is a total fodder shortage of millions of tons, for the country. Dr. Bekere describes the urgent need for proteins containing essential amino acids in an optimum ratio in animal raising and explains why many grain crops are deficient in these needed amino acids and recommends expansion and refinement of lysine production as a means of improving this situation. Scientists at the LaSSR Academy of Sciences Institute of Biology, the USSR Academy of Sciences Institute of Biochemistry imeni A. N. Bakh, the LaSSR Institute of Microbiology imeni Avgust Kirkhenshteyn, and other institutes, have developed an original method of microbiological production of lysine, using a specially selected bacteria culture. After careful study of the biological effect of the first batches of this amino acid on animals, it was possible to develop an optimum preparation form of lysine concentrate. These studies showed the possibility of biosynthesizing lysine from sugar production wastes and harmless mineral salts more cheaply and more simply than is possible in foreign plants, with side production of some other substances useful to the body and without damage to the environment. Dr. Bekere describes further developments of the process and aspects of development and construction of modern lysine production facilities. Attempts to reprocess new varieties of grasses into protein concentrates are mentioned briefly.

[1985-2791]

EARLY DETECTION OF POTATO VIRUS DISEASES

Moscow TEKHNIIKA I NAUKA in Russian No 6, Jun 85 pp 17-18

VELEDNITSKIY, A.

[Abstract] This article, entitled "How to Recognize a Virus?" describes and discusses methods of potato virus control based on gene engineering techniques being studied at the ESSR Academy of Sciences Institute of Chemical and Biological Physics. The techniques being studied and tested are based on the research findings of Keller and Milstein and involve breeding of a hybridoma with required specific properties and reproduction of monoclonal antibodies, specifically against potato virus. The techniques can be used to control viruses which infect flowers, vegetables and fungi. Use of mice as an ideal "mini" factory of antibodies for breeding hybridomas which can elaborate the most diverse antibodies is described. A hybrid line of cells can be used to produce preparations on an industrial scale, which can make possible very early detection of viruses. The amazing success against potato virus achieved by use of these methods at the ESSR kolkhoz "Yarva Yaani" is described.

[1993-2791]

UDC 575.24.577.352.42

USE OF CHELATING AGENTS IN TRANSFORMATION OF YEASTS BY PLASMID DNA: IMPORTANCE OF LIPID PEROXIDATION IN INDUCTION OF YEAST COMPETENCE

Moscow BIOPOLIMERY I KLETKA in Russian Vol 1, No 3, May-Jun 85 (manuscript received 25 Jul 84) pp 147-153

GORLOV, Yu.I., KIRILLOVA, V.S., ZHAROVA, L.G., LIKHACHEVA, L.I. and KORDYUM, V.A., Institute of Molecular Biology and Genetics, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] Double replicon plasmid RB4 was employed in the transformation of *Saccharomyces cerevisiae* 746 and LL-20 pretreated with the lipophilic chelating agents 8-hydroxyquinoline or 1,10-phenanthroline. The chelating agents were found to induce competence in the yeast cells, with the transformation efficiency reaching 4×10^3 to 2×10^4 per $10 \mu\text{g}$ of plasmid DNA. The effects of the chelating agents in promoting transformation were ascribed to peroxidation of membrane lipids, as indicated by the accumulation of diene conjugates in yeasts treated with these agents. Untreated yeasts were not transformed by exposure to the RB4 plasmid. Lipid peroxidation evidently induced structural changes in the yeast wall membranes favorable to the uptake of DNA. Figures 3; references 14: 7 Russian, 7 Western.

[2041-12172]

UDC 549.211+669.334.43

EFFECT OF RADIATION PROCESSING OF SULFIDES ON PROCESS OF BACTERIAL LEACHING

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 283, No 1, Jul 85 (manuscript received 28 Sep 84) pp 201-202

YAKHONTOVA, L.K., NESTEROVICH, L.G., KALYAZIN, Ye.P. and RUDNEV, A.V., Moscow State University imeni M.V. Lomonosov

[Abstract] Study of bacterial leaching of pyrite and chalcopyrite, pre-irradiated by gamma-quanta in a $6 \cdot 10^8$ rad dose, involving the use of 2 forms of pyrite (with p-type conduction and electron conduction) and chalcopyrite with electron conduction showed considerably reduced leaching of the irradiated sulfides while the overall mechanisms of the process were the same as those found in known data. Pyrite with the different types of conduction and chalcopyrite with artificially created radiation defects are scarcely leached by bacteria. The much lesser leaching of pyrite with different types of conduction and the chalcopyrite with artificially created radiation defects is due to the fact that the described changes of electron structure of the irradiated sulfides are related to the valent state of Fe and Cu with both cations in the irradiated samples acquiring a higher valence. For microorganisms which oxidize sulfides in order to survive, irradiated minerals are less suitable as a life-support substrate so radiation processing of sulfides can not increase the intensity of leaching of sulfide ores. Figure 1; references 7 (Russian).
[1988-2791]

ECOLOGY

WELL-BEING OF EARTH

Moscow SOVETSKAYA ROSSIYA in Russian 31 Jul 85 p 4

KURAZHNSKOVSKIY, professor at Rostov University, REVIYAKIN, V., professor at Altai University and SMOLOVIK, candidate of medical sciences

[Abstract] Two ecologic tasks are identified as important issues: detailed characterization of the territories with practical evaluation of the ecologic conditions existing there and introduction of ecologic principles to human health protective measures. In the first case, questions are being raised on future productivity of various agricultural slants, on their chemical composition and on particular brands most suited for given conditions. The second issue concerns patterns of diseases and ways of possible prevention. Unfortunately, so far, no recommendations have been made either in agriculture, public health or in environmental protection which are based on solid ecological principles. Ecological specialists must be consulted in attempts to solve these problems; this is seldom done.

[2047-7813]

FOOD TECHNOLOGY

SEAWEED CULTURE AND CONTINENTAL SHELF PROTECTION

Moscow PRIRODA in Russian No 7, Jul 85 pp 36-41

PRZHEMENETSKAYA, V.F., candidate of biological sciences, Pacific Scientific Research Institute of Fisheries and Oceanography, Vladivostok

[Abstract] The initial impression that the resources of the oceans were limitless has been replaced by a more rational appreciation that everything has its limits, including the seemingly infinite resources of marine plant life. In addition, experience in California, Australia, China, Japan and Korea has demonstrated that depletion of seaweed resources for commercial utilization has a deleterious effect on the biocenotic status of the continental shelf. In view of this, many countries, such as Japan, China, Korea, the Philippines and the USSR, have embarked on aquaculture programs, in which seaweeds are cultivated on marine plantations. Successful developments in this direction should go a long way to preserving the natural ecologic balance on the continental shelf, and yet provide mankind with the resources of the deep. Many difficulties remain to be resolved before aquaculture programs become fully cost effective, one of which deals with the susceptibility of a monoculture to a given predator or disease. To that end, such programs necessitate the creation of well-balanced systems that would support a variety of marine plant and animal life without an adverse effect on the desired crop. Figures 6; references 4: 1 Russian, 3 Western.
[1977-12172]

GENETICS

UDC 616-056

CORRELATION BETWEEN INCIDENCE OF CHILDREN WITH DOWN'S SYNDROME AND MATERNAL AGE

Tbilisi SOOBASHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian Vol 117, No 2, Feb 85 (manuscript received 2 Sep 83) pp 393-396

KOCHAKIDZE, N.G., Tbilisi State University

[Abstract] A statistical analysis was conducted on the correlation between the incidence of children born with Down's syndrome and maternal age in Tbilisi for the period 1968-1982. The incidence of such children born to mothers 18 to 32 years of age was insignificant. A sharp increase in Down's births occurred to mothers 33-37 years of age, with a peak incidence ascribed to 40 year old women (there are very few births to women over 40 in Tbilisi). There were no sex factor differences among the patients; in addition, during the 14 year period of observation there was a steady increase in the incidence of such births. Figures 2; references 7: 1 Russian, 6 Western.
[1992-12172]

UDC 636.082.12

IMMUNOGENETIC MONITORING IN ANIMAL HUSBANDRY

Moscow ZHIVOTNOVODSTVO in Russian No 4, Apr 85 pp 36-37

BAGRIY, B.A., professor, and MESHCHERYAKOV, V. Ya., candidate of agricultural sciences, VNPO All-Union Production Association for pedigree stockbreeding in animal husbandry, USSR Ministry of Agriculture

[Abstract] The importance of immunological monitoring in various areas of animal husbandry is discussed. Development of immunology and biochemistry led to determination of many polymorphic systems of the blood. The presence of many alleles in these systems, the constancy throughout the life of an animal and the codominant nature of succession make it possible to use them as genetic markers. Immunogenetic tests are being used more extensively in animal husbandry practice and are becoming compulsory in selection work with various species of farm animals. Genetic polymorphism is used to check the authenticity of descent of pedigree animals. Mistakes in tracing pedigree lines are not

uncommon. Therefore zonal immunogenetic laboratories are being organized in the USSR in order to perform completely reliable tests on pedigree animals. There are 46 such laboratories in the USSR, including 26 at scientific research institutes, 17 at state pedigree associations and 3 at agricultural institutes. The laboratories are staffed by 350 persons. The most qualified experts in cattle pedigree lines are in the LiSSR, the ESSR, the BSSR, in the area serviced by immunogenetics laboratories attached to VNIIRGZh (not further identified), Kuybyshev State Pedigree Association and Krasnodar Kray Pedigree Association. The zonal laboratory of Krasnodar Kray Pedigree Association is studying not only blood groups but also the chromosome composition in sires in order to detect network bulls which are carriers of chromosomal anomalies and exclude them from service. The importance of use of immunogenetic tests in swine breeding and horse breeding is discussed. Use of data concerning blood groups of swine during selection of parental pairs is recommended in order to increase fecundity and viability of the progeny and prevent hemolytic disease in piglets and to select animals resistant to stress syndrome (VIZh [All-Union Scientific Research Institute of Livestock Breeding], SibNIPTIZh (not further identified), BelNIIZh [Belorussian Scientific Research Institute of Animal Husbandry], and others). Work carried out in Leningrad Oblast has shown that immunogenetic tests may be used successfully at commercial swine complexes. Aspects of use of immunological monitoring in horse breeding and sheep raising are discussed. Progress in the introduction of such monitoring is discussed briefly.

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[1983-2791]

UDC 633.14:58

ASSESSMENT OF HEREDITARY TRAITS OF RYE IN DIALLELIC CROSSINGS

Minsk DOKLADY AKADEMII NAUK BSSR in Russian Vol 29, No 8, Aug 85 (manuscript received 2 Aug 84) pp 75-752

KEDROV-ZIKHMAN, O.O., SHAREPO, T.I. and BEL'KO, N.B., Institute of Genetics and Cytology, Belorussian SSR Academy of Sciences

[Abstract] Two-year studies were conducted with diallelic crossings on eight self-pollinating lines of rye to assess inheritance of several traits of economic importance. The resultant determinations of inheritance coefficients (H^2 and h^2) were then used to evaluate the genetic variability of the traits of interest. The greatest degrees of genotypic variability were seen with the following traits: grain count per main ear, weight of 1000 grains, weight of grain per ear, and plant height. Non-additive genetic effects were found responsible for genotypic variability of grain counts and grain size, while ear weight was due to additive effects. Both, additive and non-additive effects, were highly important in determining plant height. References 12 (Russian).

[2036-12172]

HUMAN FACTORS

VOICE ANALYZER FOR EVALUATING PILOTS' CONDITION

Moscow GUDOK in Russian 15 Aug 85 p 4

DVIGANTSEV, S. [Moscow]

[Abstract] This article reports on the development of a system called "Equipment for Distinguishing Speech-Signal Parameters" (SVPRS). The system is intended for monitoring the condition of airplane crews in the course of long flights through voice analysis from radio conversations. The system is capable of evaluating a subject's emotional state on the basis of a single spoken word, it is claimed. The system is being developed by the department of aviation medicine of the State Scientific Research Institute of Civil Aviation, with assistance from the USSR Academy of Sciences' Institute of Higher Nervous Activity and Neurophysiology, and, also, cyberneticists of Leningrad.

Candidate of Medical Sciences Aleksandr Ivanovich Onufrash, head of a laboratory of the civil aviation institute's aviation medicine department, said that the system consists of a magnetic memory, audio-signal filters, a frequency analyzer, a minicomputer, and instruments for processing recordings of speech and for input of data into the computer. Work on perfecting the system is said to be continuing.

FTD/SNAP
CSO: 1840/2078

IMMUNOLOGY

UDC 577.23

**METABOLIC STATE OF LIVER AND LYMPHOCYTE MITOCHONDRIA RESULTING FROM
ADMINISTRATION OF T-ACTIVIN COUPLED WITH COLD EXPOSURE**

Moscow BIOKHIMIYA in Russian Vol 50, No 4, Apr 85 (manuscript received
25 Jul 84) pp 639-644

AGUREYEV, A.P., KIRILLOVA, G. P., MOKHOVA, Ye. N., ARION, V. Ya. and
SMOL'NIKOVA, L. B., Laboratory of Molecular Biology and Bioorganic Chemistry
imeni A. N. Belozerskiy, Moscow State University imeni M. V. Lomonosov;
2-nd Moscow State Medical Institute imeni N. I. Pirogov

[Abstract] T-activin (TA) is an immunoregulator with a wide spectrum of activity. Effect of TA in rats was investigated on oxidation systems and energetic conjugation of liver mitochondria (LM) and thymus lymphocytes. Daily 10-min swimming in cold water (+20°C) was used as the stress factor. After 10 days of experimentation oxygen consumption in LM increased from 3.6 to 4.4 O_2 $min^{-1}mg^{-1}$ protein; when injected with endogenous immunomodulator TA, this value increased to $6.5 \pm 0.6 O_2$ $min^{-1}mg^{-1}$ protein. No changes were noted in the metabolic states of LM, respiratory rate and in membrane potential of LM. An assumption could be made that one of the regulatory effects of TA is a change in the phospholipid composition of membranes. The activation of internal oxidation path of NADH can be observed in other situations--not just in adaptation to cold: for example, chronic administration of pyracetam adaptogen also activated this process in LM. On the basis of these data it could be concluded that TA is analogous to other adaptogens, thus expanding the range of adaptogens. Figures 2; references 17: 12 Russian, 5 Western. [1995-7813]

UDC: 616.71-018.46-092:9:615.372

INFLUENCE OF IMMUNIZATION BY ALLOGENIC ANTITUMOR VACCINE ON FUNCTIONAL
ACTIVITY OF MOUSE BONE MARROW CELLS

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR. SERIYA B: GEOLOGICHESKIYE,
KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 7, Jul 85 (manuscript
received 17 Jan 85) pp 68-71

ZATULA, D.G., corresponding member, Ukrainian Academy of Sciences,
ZAGORUYKO, Ye.Ye., PANCHENKO, N.A. and SEMERNIKOV, V.A., Institute of
Problems of Oncology, Ukrainian SSR Academy of Sciences, Kiev.

[Abstract] Results are presented from a study of certain morphologic and functional characteristics of bone marrow cells from vaccinated and intact mice before and after implantation of living tumor cells. Dynamics of the change in intensity of indirect luminescence of bone marrow cells, reflecting the functional activity of nucleoproteins, were determined. The cell composition of the bone marrow was studied and characteristics of bone marrow explantates in vitro determined. Vaccines used were antitumor vaccines suggested by the authors in previous articles, the antitumor resistance induced by which is characterized by increased activity of T-, B- and A-immunity systems, manifested as an increase in cytotoxicity of lymphocytes, blood serum, and activation of mononuclear phagocyte systems. The bone marrow cells of animals vaccinated with the allogenic antitumor vaccines, as well as vaccinated and intact animals after implantation of tumor cells, manifested a number of morphofunctional specifics, the combination of which can be used to determine certain mechanisms of regulation of the inductive phase of the immune response and control its level. Preliminary vaccination provides for early involvement in the immune response of cells in the mononuclear phagocyte system with subsequent stimulation of the lymphocyte system. Figure 1; references 12: 10 Russian, 2 Western.
[2032-6508]

UDC 612.01

LACK OF IMMUNOGENICITY OF ANTIGEN DISPLACED IN VIVO FROM CARRIER POLYMER

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 283, No 3, Jul 85
(manuscript received 11 Mar 85) pp 744-748

PETROV, R.V., academician, USSR Academy of Sciences (AS), KABANOV, V.A.,
corresponding member, USSR AS, KHAITOV, R.M., MUSTAFAYEV, M.I. and NORIMOV,
A. Sh., Institute of Immunology, Moscow

[Abstract] In vitro studies have demonstrated that heparin will displace bovine serum albumin (BSA) from electrostatically linked complexes of BSA and poly-4-N-ethylpyridinium bromide (I), but not from covalent conjugates of BSA and the 4-vinylpyridine-4-vinyl-N-carboxymethylpyridinium bromide (II). To assess the effects of in vivo dissociation of such immunogenic complexes

on the antibody response to BSA, splenic antibody cells were assayed in C57BL/6 and (CBA x C57BL/6) F_1 mice immunized with either I or II with, or without, subsequent treatment with heparin. Determinations of antibody-forming cells after 9 days showed that administration of heparin concurrently with or 0.5, 2.0 or 24 h after immunization with II had no effect on the antibody response. However, administration of heparin at time 0 or 0.5 h after immunization with I completely abolished the antibody response, decreased the number of antibody-forming cells to half the control value when administered in 2, and was ineffective when given after 24 h. These observations indicate that the minimum trigger time for an immune response against a thymus-independent antigen is ca. 0.5 h. Figures 2; references 10: 9 Russian, 1 Western.

[2034-12172]

JPRS-UBB-85-024
22 October 1985

LASER EFFECTS

BRIEF

SHIPBOARD LASER UNIT--Vladivostok--The depot ship "Kaliningradskiy komсомоlets" has become the first vessel of the Far East Basin to be equipped with a laser medical unit. This laser is particularly effective in the treatment of skin diseases. The hands of fish-processing workers are constantly exposed to the effects of salt, which can lead to problems. Such conditions are treated far more quickly by the laser unit than with conventional means of treatment. By the end of this year, another five factory ships for fish processing will be equipped with similar laser apparatus, as will several onshore medical centers for workers of the fishing industry. The health of people who work at sea is under constant supervision. More than 700 medical personnel are now working on board fishing vessels. A special chair of instruction at the Vladivostok Medical Institute is training many of these personnel. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 17 Aug 85 p 4]

FTD/SNAP

CSO: 1840/2078

GEORGIAN SSR MONOGRAPHS ON PALEONTOLOGY

Tbilisi ZARYA VOSTOKA in Russian 25 Jun 85 p 4

[Article by Dzilda Ivanishvili under the rubric "Fact in Closeup": "Growing Interest in Works By Georgian Scientist"]

[Text] A popular U.S. publishing house in Washington, Amerind Publishing Company, has published in English a monograph by Doctor of Biological Sciences Gurama Mchedlidze, deputy director of the Institute for Paleobiology imeni L. Sh. Davitashvili of the Georgian SSR Academy of Sciences, entitled "Basic Characteristics Of the Paleobiological History of Cetaceans." This is the scientist's second monograph published in English in the United States. At this time, U.S. paleontologists are getting ready for the publication of yet another book by the Georgian researcher, "Fossil Cetaceans of The Caucasus."

Cetaceans--whales and dolphins--represent a group of marine mammals or secondary water animals whose ancestors lived on dry land. In modern scientific literature the interpretation of the paths of evolution of these water mammals is highly contradictory. Therefore, study of their paleobiological history remains extremely important, both for study of bionomic conditions of the ancient seas as well as from a general biology point of view. Study of the history of their development and adaptation to the new water environment is attracting the attention of scientists from countries where remains of these fossil animals are observed--the United States, Italy, Austria, France and Rumania. In our country [USSR] fossil remains of cetaceans are encountered in the Caucasus, Moldavia, the Ukraine and in Central Asia. A large number of fossil remains are buried in the Upper Maykopskiy deposits, in the Apsheronkiy Peninsula region, in the environs of the village of Perekishkyul (Azerbaijan), and in neogenic deposits in western and eastern Georgia. The study of this extremely rich material, the basis of the Georgian scientist's research, made it possible for him to establish the geological age of fossil remains obtained from ternary deposits. This is the reason for the great interest of foreign specialists in these scientific works by Gurama Mchedlidze. At the Smithsonian Institute in Washington, where problems of natural science and particularly questions of the historical development of fossils are studied, staff workers undertook translation into English of

Gurama Mchedlidze's books in order to make them more available to foreign scientists. In their opinion, the Georgian scientist's works present fresh material for acquaintance with the entire range of problems of theoretical biology and evolutionary science. This data can also be used to solve problems of biostratigraphy--for correlation of marine sedimentary formations that are geographically far apart.

The close scientific ties of the Georgian scientist with foreign paleontologists, especially those in the United States, presents a favorable opportunity to exchange the latest achievements in this field of biological science. The well-known American paleontologist, Remington Kellogg, now deceased, held the works of the Georgian scientist in high regard. His many followers and students studying fossils at various scientific research institutes in New York, Los Angeles, Washington, etc., continued a tradition of scientific collaboration with the Soviet scientist.

12262
CSO: 1840/1976

UDC 577.17

AMINOACID SEQUENCE OF β -LIPOTROPIC HORMONE FROM LITTLE PICKED WHALE

Moscow BIOKHIMIYA in Russian Vol 50, No 4, Apr 85 (manuscript received 28 Nov 83) pp 543-553

PANKOV, Yu. A. and BOCHKOVA, O. P., Institute of Experimental Endocrinology and Hormone Chemistry, USSR Academy of Medical Sciences, Moscow

[Abstract] Aminoacid sequence of the β -lipotropic hormone--a precursor of pituitary β -endorphine--was established. The hormone was obtained from the pituitary glands of the little picked whale (*Balaenoptera acutorostrata*). Its molecular weight was found to be $11,220 \pm 1,000$. An analysis of trypsin and chymotrypsin hydrolysates of this protein produced several hormone fragments. The sequence of the N-terminal amino acids was: NH_2 -Glu-Leu-Ala-Gly-Glu-Arg-Pro-Glx-Pro-Ala-Arg... By comparison of the aminoacid sequences of the isolated fragments, the primary structure of β -lipotropin was established. Figures 5; references 40: 5 Russian, 35 Western.
[1995-7813]

MEDICINE

BLOODLESS SURGERY

Moscow APN DAILY REVIEW in English 19 Jul 85 pp 1-3

IVCHENKO, L.

[Text] A non-traumatizing technique of vascular prosthetics has been a success in clinical practice.

Angiographic surgery is a nonoperative treatment of blood vessels, a bloodless, organ-saving intervention which has great advantages as compared to traditional surgery. It can be used to stop any kind of bleeding, to disconnect any organ, or part of an organ, from the blood circulation system, to restore the blood stream in the vessels blocked by thrombi, sclerotic patches and so on. Dilatation is considered the most promising trend in the new method. It is carried out in the following way: a catheter with an empty balloon at the end is inserted into an artery (a blown-up balloon will not get through), the whole operation being controlled on an X-ray display. When deep inside the vessel, the end of the catheter expands when filled with a contrast medium, to be seen clearly on the X-ray display. Under a pressure of 6 to 8 atmospheres, excessive liquids are removed from the vessel and sclerotic patches are flattened out and pressed against the walls, thus restoring the blood flow in the vessel.

"Like any other method, ours has faults of its own," says Professor I. Rabkin. "We cannot guarantee normal vessel function to last for many years. The thing is that the disorder is often caused by the general condition of the body, so obstacles to the blood flow in that particular vessel are likely to form again on the very same spot. We set ourselves the task to do something to make the relapses impossible. It occurred to us to supply the vessel with a kind of inner frame which would prevent its obstruction. That was when a discovery made by the distinguished metallurgy researcher, Academician G. Kurdiumov came in handy."

What does a discovery in the field of metallurgy have to do with the development of a new method of vascular surgery? Well, it has made it possible for medical researchers to solve their problem.

"The alloys of some metals are capable of 'retaining' a certain shape," explained Rector of the Moscow Institute of Metals and Alloys, P. Polukhin, Hero of Socialist Labor. "When exposed to a different medium or temperature,

they can change their shape. If placed into the initial physical medium, they seem to 'remember' their original state and resume their initial shape. That principle served as the basis for the development of a new endovascular technique. It is impossible to insert a spiral into a blood vessel: it has to be straightened out, to resume its spiral form only when inside the vessel."

The first task faced by the research associates of the thermomechanical procession laboratory led by Professor M. Bernstein was to obtain a biologically inert and non-toxic alloy suitable for the purpose. Nickel and titanium alloys turned out to possess the required properties. The second task was to select one particular alloy out of the group, which would resume its shape within a rigid temperature interval, that is, between 36° and 40° C, or the human body's temperature range. Medical nitinol turned out to be perfect for that purpose.

After local anaesthetics have been administered, the vessel is punctured and a conductor inserted into the blood vessel. The conductor is a resilient, thin wire, something like a guitar string, supplied with a soft ballpoint to avoid injuring the vessel. An X-ray installation and a TV screen make it possible for the surgeon to follow its progress, centimeter by centimeter. As soon as it reaches the obstruction, it is time to insert the catheter with an expanding end.

We can observe the little balloon on the screen now: it clears the way for a spiral to be inserted. Every time it swells up we can see it longer than the previous time, as the pressure on the vessel walls increases. Another go and it's time to insert the spiral. It has already straightened out, so the task now is to fix it at its destination. On the screen we can see it coiling up to reinforce the vessel from within.

The staff of the All-Union Surgical Research Center of the USSR Academy of Medical Sciences have set themselves the task of equipping all the major medical centers of the country with the angiographic surgery facilities.

Director of the Center, Academician B. Petrovskiy, who leads the studies in vascular pathology, says: "At present this country has 126 centers using contrast medium and intracardiac methods of X-ray examination, which is more than anywhere else in the world. Our task is to familiarize them with the latest achievements in angiographic surgery. A large-scale application of those methods will have a great economic effect, apart from all other advantages: a great number of patients discharged from hospitals, sooner than they would in the past, will be able to resume their normal life and work!"

At present the scientists are trying to extend the range of their intervention. Endovascular prosthetics, for instance, is now possible in two kinds of blood vessels, the femoral and the iliac arteries. The next thing to do is to "work" at such hardly accessible places as kidney and heart vessels.

(IZVESTIYA, July 6. Abridged.)

CSO: 1840/2013

LIGHT THERAPY FOR ULCERS

Moscow TASS in Russian 24 Jul 85

[Text] Soviet physicists have ascertained the mechanism of ordinary red light's therapeutic action.

The scientists, working at the Spectroscopy Institute of the Soviet Academy of Sciences, found out that red light of a certain wave-length speeds up the synthesis of nucleic acids which are endemic in all living on earth and are responsible for hereditary information.

With the cells' vital activity increased in this way, wounds tend to heal more quickly. It takes just an ordinary lamp of, say, 100 watts and a color filter, which allows the red light of a certain wave-length to pass through, to achieve an effect. Noticing that such light influences plant and animal tissue alike, the scientists suggested that both plant cells and animal cells contain phytochromic complexes inherited from common progenitors and that it is they that react to the light.

The physicists put the discovery to use by pooling efforts with physicians to work out a light-therapy technique and devise a corresponding instrument. Simple and cheap, the latter consists of a lamp, color filter and light guide to be introduced into the affected area.

The instrument was tested in two Moscow clinics to treat different ulcers that are usually hard to cure by conventional methods, including intestinal ulcers; a total of 93 percent of the 500 patients involved in its trial were cured completely.

Depending on the disease, a light-therapy course includes from four to 15 sessions, each lasting several minutes, and may be administered to outpatients.

CSO: 1840/2001

TREATMENT OF BLOOD DISORDERS AT GEORGIAN SSR HEMATOLOGY INSTITUTE

Tbilisi KOMUNISTI in Georgian 14 May 85 p 3

[Editorial Comment]

[Abstract] This is G. Gokadze's article about activities of the Mukhadze Scientific-Research Institute for Hematology and Transfusiology, which is hosting a 2-day conference in observance of its 50th anniversary, in the course of which it has been given All-Union and Georgian awards. Institute Director Ilia Zedginidze notes the presence of distinguished hematology specialists from elsewhere in the USSR as well as Czechoslovakia, Poland, Romania, and Bulgaria, and explains some of the major thrusts of the institute's activities in research, training, and treatment. These include the study of the action of transfused blood and its components; the mechanism of blood formation, how it may be disrupted, and the role of the nervous and endocrine systems; considerable focus in the past 10 years on leucosis, for whose pathogenesis a new concept has been developed; the incidence of hemoblastosis in Georgia, risk factors, and the use of Soviet-made drugs in combating it; congenital and acquired anemia, especially in women and small children; and the incidence of thalassemia, the most widespread form of congenital anemia in Georgia.

CSO: 1840/1998

UDC 616-001.36:612.115.35.615

HEPARIN THERAPY IN SEPTIC SHOCK

Tbilisi SOOBSHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian Vol 117, No 2, Feb 85 (manuscript received 2 Sep 83) pp 421-423

DOBROVOL'SKIY, V.I., SOROKINA, M.I., MAKATSARIYA, A.D.. and NESTEROVA, S.G.,
First Moscow Medical Institute imeni I.M. Sechenov

[Abstract] Heparin therapy was employed in the management of 30 patients with septic shock and acute renal failure complicated by disseminated intravascular coagulation. The patients were on an individually-adjusted regimen of 30,000 to 50,000 U of heparin per day, with the effectiveness monitored by clinical chemistries (thromboplastin time, thromboelastography, etc.). Improvements were generally seen after 14 to 30 days of heparin therapy. The outcome results indicated that heparin administration represents an effective means of overcoming disseminated intravascular coagulation in patients with septic shock and renal failure, provided the therapy is individually adjusted on the basis of biological indicators.

[1992-12712]

UDC 616-001.36:612.115.35.615

AMINOGLYCOSIDE OTOTOXICITY IN ACUTE RENAL INSUFFICIENCY

Tbilisi SOOBSHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian Vol 117, No 2, Feb 85 (manuscript received 20 Oct 83) pp 425-427

SOROKINA, M.I., DOBROVOL'SKIY, V.I., ISAYEV, N.M., FEDOSEYEVA, Ye.N. and SHKROB, L.O., First Moscow Medical Institute imeni I.M. Sechenov

[Abstract] Studies were conducted on factors contributing to the ototoxicity of aminoglycoside antibiotics in the case of patients with acute renal insufficiency and sepsis. Analysis of 634 cases demonstrated that prior to pharmacokinetic analysis of aminoglycoside concentrations in the blood, routine chemotherapy led to 34 cases of ototoxicity. However, subsequently (since 1971) only 5 cases were encountered. The decrease in the incidence of aminoglycoside-dependent ototoxicity was ascribed to pharmacokinetically-substantiated dosage regimens. Basically, gentamycin or kanamycin are administered in respective doses of 0.04 g or 0.5 g per day at 3-4 day intervals. In patients on hemodialysis the interdose interval is reduced to 2-3 days because of hemodialysis-mediated reduction in effective antibiotic concentration of 26-38%. In surgical patients 1/2 the regular dose is administered on the day of the operation.

[1992-12172]

IMMOBILIZATION OF TUBAZIDE ON POLYURETHANE MATRIX

Alma-Ata VESTNIK AKADEMII NAUK KAZAKHSKOY SSR in Russian No 6, Jun 85 pp 60-62

BATYRBEKOV, Ye. O., RUKHINA, L. B., AL'BAZAROV, B. Sh., MOSHKEVICH, S. A. and ZHUBANOV, B. A.

[Abstract] In an attempt to prolong the effect of antituberculosis preparation Tubazide, it was immobilized on polyurethane matrix and its properties were investigated. This drug was uniformly dispersed through the entire carrier and diffused from it at a decreasing rate. In 2-3 days, 80 to 90% of the preparation left the matrix. Bacteriological studies carried out on these polymeric preparations showed that they fully arrested the growth of tubercle mycobacterium for at least three months. Animal studies showed that treatment with Tubazide, immobilized on polyurethane matrix, gave results analogous to those obtained with the original agents without the necessity of using multiple applications. Figures 2; references 6 (Russian).
[1991-7813]

NEW METHODS OF TREATING EYE DISEASES

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Aug 85 p 4

MOSIN, I., Special Correspondent

[Abstract] New treatments (in the Moscow, Ufa and Ustinov areas) for eye diseases and trauma are popularly described, including the use of magnetophors, flexible rubber plates containing short magnetic particles, to improve sight in eyes after surgical removal of penetrating metal particles. Magnetophors are being applied to correct myopia. Magnetic fields accelerate the healing of wounds, improve blood circulation and activate oxidation-reduction reactions. Magnetophors are particularly effective in the initial stage of development of myopia. During this period, they can be used to stop the process and indeed reverse it. Regular exposure to magnetic fields also slows down progressive myopia and improves visual activity.
[2025-6508]

PATIENT CONDITION AND COMPUTER DISPLAY

Leningrad VECHERNIY LENINGRAD in Russian 22 Jun 85 p 2

ANDREYEV, A., Correspondent

[Abstract] An interview is reported with Candidate of Medical Sciences A. A. Lavrushin, laboratory chief of Medical Mathematical Studies at the All-Union Scientific Research Institute of Pulmonology, USSR Ministry of Health. Computerization was introduced at this institute some twenty years ago when algorithms were developed for differential diagnosis of hematomas. Data would be relayed by telephone from a first aid ambulance to a dispatcher, and a diagnosis would be made centrally by the computer. Basically, human beings are very complex, where many factors interact. Computers are ideal for handling massive amounts of data. Yet the role of a physician is not diminished, because he is the leading probe for more data in specific cases. Several specific applications to post-perfusion lung syndrome, differentiation between cystic lung hypoplasia and cyst-like broncho-ectasis or pediatric pneumonia from various respiratory-viral diseases are discussed. The future application of computers will be in modelling of physiological systems; the immunologic system is already being modelled. Differential diagnosis will benefit from computers as well.

[2048-7813]

PRIZE NOMINATION FOR ABACTERIAL WOUND AND BURN TREATMENT

Moscow MEDITSINSKAYA GAZETA in Russian 9 Aug 85 p 3

SHAPOSHNIKOV, Yu., professor, director of the Central Scientific Research Institute of Traumatology and Orthopedics imeni Priorov

[Abstract] The author discusses the background of the work entitled "Development and Introduction of Highly Effective Methods for Treating Wounds and Burns in a Regulated Abacterial Environment; and Development and Series Production of a Number of Aerotherapeutic Units for This Purpose." The work has been nominated for the 1985 USSR State Prize.

The author recalls that work on the aerotherapeutic methods was begun in the late 1970s by associates of the USSR Academy of Medical Sciences' Institute of Surgery imeni Vishnevskiy. Three units with automatic control systems--ATU-1, ATU-3, ATU-5--were developed in collaboration with the Odessa Refrigeration Machinery Production Association. These units are intended for the treatment of extensive burns and wounds in hospitals and burn-treatment centers. The ATU-3, an intensive-therapy unit, can be assembled in a matter of hours in facilities that are not equipped for this purpose. It can also be used to treat frostbite. The ATU-5 is designed for one or two patients at a time; two to five can be treated with each of the other two units. The units were prepared for series production by personnel of the surgery institute and the USSR Ministry of Chemical and Petroleum Machine Building.

FTD/SNAP
CSO: 1840/2078

MICROBIOLOGY

UDC 577.1:577.15:575

R-FACTOR FROM NATURAL STRAIN OF SALMONELLA DERBY CARRYING DNA-POLYMERASE GENE

Moscow BIOKHIMIYA in Russian Vol 50, No 4, Apr 85 (manuscript received
16 Aug 84) pp 673-679

SARKISYAN, N. N., ANTONYAN, R. G., SVETLOVA, M. P., KTSOYAN, Zh. A. and
TOMILIN, N. V., Institute of Experimental Biology, ArmSSR Academy of Sciences,
Yerevan; Institute of Cytology, USSR Academy of Sciences, Leningrad

[Abstract] R-factor was identified in a Salmonella derby strain, which was responsible for multiple stability to antibiotics. This plasmid was eliminated by treatment with ethidium bromide; the activity of DNA-polymerase was decreased 10 to 50 fold. This principal activity was associated with a plasmid 6 tpn [Thousand Pairs of Nucleotides?] long which is evidently responsible for resistance to chloramphenicol. This polymerase is evidently used in DNA repair processes because S. derby K82 pol⁻ strain is sensitive to UV light. Inclusion of the plasmid into that strain by conjugation or transformation reconstitutes resistance to UV light. Figures 4; references 21: 5 Russian (1 by Western author), 16 Western.
[1995-7813]

MILITARY MEDICINE

SOVIET MEDICAL LEADERS

Moscow KRASNAYA ZVEZDA in Russian 16 Jun 85 p 4

AGAPOVA, Ye., KRASNAYA ZVEZDA correspondent

[Abstract] Short biographical sketches are presented of three leading Soviet physicians, all of whom graduated from the Military Medical Academy imeni S. M. Kirov and are now on its faculty. Major (Medical Services) Yuriy Leonidovich Shevchenko is a cardiac surgeon with many unique contributions to the field. One of his outstanding discoveries was that 'disinfection' of the interior of the heart chambers could be achieved with ultrasonication of the cavities, a method that has proven itself to be highly effective in the management of infectious endocarditis. Colonel (Medical Services) Vladimir Olegovich Samoylov has devoted himself to biophysics and molecular biology, and, among his many contributions, is a luminescent method for the determination of malignant transformations in cells. General-Major (Medical Services) Vitaliy Aleksandrovich Khil'ko, Chief Physician of the USSR Ministry of Defense, is by profession a neurosurgeon and an electrophysiologist. He has received international recognition for his many contributions to clinical medicine and basic sciences. One of his most highly acclaimed original discoveries is the use of electrical stimulation of nerves to initiate their physiological functions. Thus, for example, he has found that stimulation of the optic nerve can lead to recovery of vision in certain cases, and has also been instrumental in perfecting techniques for implantation of electrodes from electronic cameras into the occipital region, enabling blind persons to distinguish patterns and shadows.

[382-12172]

JPRS-UBB-85-024
22 October 1985

MILITARY MEDICINE

BRIEF

HEALTH RESORT IMPROVED--One of the most famous of the Crimea's health resorts, Feodosiya Central Military Resort, is being transformed with every passing year. Thousands and thousands of military personnel, members of their families and army and navy veterans improve their health here. This resort is praised for its unique curative muds, medicinal mineral waters, warm sea and gentle climate. Several years ago a medical wing with the most modern equipment and a comfortable beach complex were put into operation. This July, the first visitors were hospitably welcomed to a new 300-bed dormitory wing. A bright 12-story building of original construction was built by military builders under the direction of Lieutenant-Colonel G. Los'kov. It blended in with the coastline area of the resort town. The new wing has one- and two-bed rooms, cozy lobbys and all the equipment necessary for relaxation. [By.V. Nazarov] [Text] [Moscow KRASNAYA ZVEZDA in Russian 16 Jul 85 p 4] 12793

CSO: 1840/385

MOLECULAR BIOLOGY

UDC 576.3.08

LONG-LIVED HETEROKARYONS OF ANIMAL AND YEAST CELLS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 282, No 4, Jun 85 (manuscript received 19 Feb 85) pp 986-989

BORODINA, L.I., KIRYANOVA, Ye.A., FEDOROVA, L.I. and ZELENIN, A.V., Institute of Molecular Biology, USSR Academy of Sciences, Moscow

[Abstract] Production of long-lived, viable heterokaryons of yeast cells and actively proliferating animal cells in a culture and study of the possibility of functional interaction of genomes of these cells involved the use of protoplasts of cells of yeast organisms *Endomyces magnusii* and *Torula utilis*, mouse fibroblasts cells (strain L) and cells of a mutant line of Chinese hamster fibroblasts (strain GGFRT). After fusion of the cells, viability of the heterokaryons was determined after intravital staining by acridine orange fluorochrome and use of luminescence microscopy to determine the structure of the nucleus and cytoplasm and the capacity to accumulate fluorochrome in the lysosomes. It was assumed that the preservation of long-term viability of the animal and yeast cells heterokaryons produced is due to functioning of the yeast genome found in the heterokaryon. The heterokaryon (animal+yeast cells) model obtained is a promising model and may be used to study pathways of metabolism, interaction and mutual effect of genomes of different taxonomic groups, which are only distantly related. The fact that gene expression in heterokaryons may be studied directly after fusion is also important. This study showed that the nucleus of cells of evolutionarily remote organisms such as animal and yeast organisms may exist for a long time (up to 25-28 days) in the heterokaryon and may be actively expressed. Figures 2; references 12: 4 Russian, 8 Western.
[1960-2791]

GENE MICROINJECTION: EXPRESSION AND REGULATION PROBLEMS

Kiev BIOPOLIMERY I KLETKA in Russian Vol 1, No 3, May-Jun 85 (manuscript received 22 Aug 84) pp 135-140

MOROZOVA, L.M. and SOLOMKO, A.P., Institute of Molecular Biology and Genetics, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] A mini review of Western literature on gene microinjection is presented, covering the beginning of the technology circa 1974 to the present. Problems that receive strong emphasis deal with DNA methylation and the efficiency of expression in mammalian cell in vivo and in in vitro tissue culture studies. Considerable attention is accorded to studies with the murine metallothionein gene, showing that under in vivo and in vitro microinjection conditions heavy metals (Cd, Zn, Cu, Hg) and glucocorticoids, e.g., deoxymethasone, may increase the rate of metallothionein mRNA synthesis. However, these investigations on expression and regulation have also shown that the target cells differ in their susceptibility to the inducing agents, and that some respond to selected heavy metals while others, only to the glucocorticoids. Beta-globulin gene has been demonstrated to persist for some 200 generations in murine fibroblasts after microinjection. The exogenous DNA molecules are inserted in a tandem head-to-tail fashion. Localization of a microinjected gene in a 'silent' region of the host chromosome precludes expression, or lack of expression may be due to a change in methylation. In most cases, sites of insertion of injected genes remain unknown and, to date, no information is available on preferred sites. References 37 (Western). [2041-1217]

UDC 575.113.576.851.5:851.48

ORGANIZATION OF LYSINE OPERON IN BACILLUS SUBTILIS

Kiev BIOPOLIMERY I KLETKA in Russian Vol 1, No 3, May-Jun 85 (manuscript received 19 Oct 84) pp 156-158

ALEKSIYEVA, Z.M., SHEVCHENKO, T.N. and MALYUTA, S.S., Institute of Molecular Biology and Genetics, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] To further define the structure of the lysine operon in *B. subtilis*, standard techniques of genetic engineering were utilized to prepare a plasmid designated as pLB1, containing BamHI segments of plasmid pBR322 (2.6×10^6 fragment) and *B. subtilis* DNA (4.5×10^6 fragment). Transformation of *lys*⁻ *B. subtilis* and *E. coli* cells resulted in *lys*⁺ transformed cells. Analysis of the type of *E. coli* mutants (*lys*⁻) that were converted to the *lys*⁺ status demonstrated that pLB1 complemented 7 types of mutations in *E. coli* and, thereby, that pLB1 contained 7 closely-linked *B. subtilis* lysine genes. These observations indicate that, in *B. subtilis*, the genes responsible for lysine synthesis are closely linked on the chromosome, unlike the case in *E. coli* where the genes are located in different regions of the chromosome. Figures 1; references 5: 2 Russian, 3 Western. [2041-12172]

UDC 577.214.622

INSTABILITY OF RECOMBINANT FILAMENTOUS PHAGES CONTAINING rpoB GENE PROMOTER

Kiev BIOPOLIMERY I KLETKA in Russian Vol 1, No 3, May-Jun 85 (manuscript received 21 Dec 84) pp 160-162

PATON, Ye.B., VUDMASKA, M.I. and SVERDLOV, Ye.D., Institute of Molecular Biology and Genetics, Ukrainian SSR Academy of Sciences, Kiev; Institute of Bioorganic Chemistry imeni M.M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] A recombinant filamentous phase mp9/rpoB was created from the filamentous phage M13mp9, characterized by the presence of the gene rpoB encoding for the beta-subunit of rifampicin-resistant E. coli RNA-polymerase, genes rplL and rplJ encoding ribosomal proteins, and the two promoters P_J and P_β. Analysis of stability of the recombinant phages was assessed in terms of rifampicin-resistance of transformed E. coli. The stability data demonstrated that removing the strong promoter P_J from the recombinant phage DNA by HindIII restrictase increased the stability of the recombinant phage. It is evident that the presence of two similarly directed promoters has an adverse effect on the stability of recombinant molecules, due either to excessive transcription or some other factors. Figures 2; references 9: 1 Russian, 8 Western.

[2041-12172]

PHARMACOLOGY AND TOXICOLOGY

UDC 577.153.4

RELATIONSHIP BETWEEN STRUCTURE OF SOME O,S-DIALKYL METHYLTHIOPHOSPHONATES CONTAINING HYDROPHILIC GROUP IN PHOSPHORYL PORTION AND THEIR ANTICHOLINESTERASE PROPERTIES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 283, No 2, Jul 85 (manuscript received 14 Aug 84) pp 387-391

KHOLBEKOV, O. Kh., DALIMOV, D. N., SADYKOV, A.A. and ABDUVAKHABOV, A.A.,
Institute of Bioorganic Chemistry, UzSSR Academy of Sciences, Tashkent

[Abstract] On the basis of previous work, an assumption was made that introduction of a hydrophilic group or atom onto the phosphoryl portion of an inhibitor molecule will make it specifically active towards acetylcholinesterase (ACE) due to better adsorption of such a radical on the active surface of ACE and poorer adsorption on active surface of butylcholinesterase. To verify this hypothesis, a series of methylthiophosphonates was synthesized containing ether and ester groups at specific distance from the phosphorus atom and compared with an analogous series of parent thiophosphonates. The data obtained showed that introduction of a hydrophilic group does indeed lead to specific activity towards ACE, as a result of its adsorption in the area of the esterase center of the active surface of ACE. Figure 1; references 6: 5 Russian, 1 Western.
[1989-7813]

UDC 612.822.1:577.214.3

EFFECT OF MEMORY STIMULATOR ETHIMIZOLE ON BRAIN CHROMATIN

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 283, No 2, Jul 85 (manuscript received 28 Dec 84) pp 490-492

BELYAVTSEVA, L.M., KULIKOVA, O. G., RAZUMOVSKAYA, N. I. and BORODKIN, Yu. S.,
Scientific Research Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad

[Abstract] One of the more important stages in consolidation of long term memory is the activation of genetic structures of brain cells. Ethimizole--a neurotropic preparation--has this ability to prolong the storage of acquired

skills; it stimulates the RNA synthesis in cellular brain nuclei enriched with neuron nuclei. An attempt was made to explain the targeting of ethimizole action in its effect on chromatin. The work was done on male white rats. Chromatin of brain cells exhibited Ca-ATPase activity which was stimulated with ethimizole. Possibly the reaction of ethimizole with non-histone proteins of chromatin could be the cause of its stimulating action on the transcriptional activity; in such a case, removal of non-histone proteins would lead to a disappearance of this effect. Laboratory experiments done in this study fully substantiated this hypothesis, that the presence of non-histone protein is necessary for the manifestation of stimulating activity of ethimizole on the transcriptional activity of chromatin. Figures 2; references 13: 6 Russian, 7 Western (1 by Russian authors).
[1989-7813]

ASPECTS OF USE OF MEDICINE PRODUCED FROM PLANTS AND HERBS

Moscow SELSKAYA ZHIZN in Russian 18 Jun 85 p 2

SHAYKIN, V., candidate of agricultural sciences

[Abstract] This article entitled "1. From the Meadow and From the Forest, Green Reserves of Health", discusses some prospects for expanding the use of medicinal herbs and plants to supplement and improve the use of synthesized medicines and points out some benefits to be derived from such a procedure while warning of problems and hazards which are involved. Medical effects of more than 180 plant species are now well known and some scientists recommend the use of many of these. Medical preparations of plant origin now make up 1/3 of all medical preparations. Some medicines of plant origin could be used to avoid side effects produced by some synthetic medicines. Use of medicines derived from plants and herbs is limited by the lack of knowledge concerning their mechanism of action, the reluctance of some scientists and physicians to use them and the doubt of their effectiveness by potential users. Collection, preparation and use of medicinal grasses should be carefully monitored and controlled. This will help to avoid depletion of rare or scarce species and provide for reliable and safe methods of preparation and use. Expansion of growth of medicinal plants and herbs is badly needed and appropriate steps in this area are not being taken. The article contains a brief description of the use of medicinal plants and herbs in post-war Vietnam.
[384-2791]

UDC 547.898:577.362.465

BIOLOGICAL ACTIVITY OF MACROHETEROCYCLIC COMPOUNDS. PART 2. COMBINED
EFFECTS OF STROPHANTHIN AND CROWN ETHERS ON MYOCARDIUM

Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 2, No 6, Jun 85 (manuscript
received 8 Jan 84; in final form 19 Feb 85) pp 588-592

LUK'YANENKO, N.G., NAZAROV, Ye.I., BOGATSKIY, A.V. (deceased), SAVENKO, T.A.,
VONGAY, V.G. and YAROSHCHENKO, I.M., Physical Chemical Institute, Ukrainian
SSR Academy of Sciences, Odessa

[Abstract] Four novel crown ethers synthesized at the Physical Chemical
Institute, Ukrainian SSR Academy of Sciences, were tested for their effects on
guinea pig myocardium in in vivo and in vitro experiments. Intravenous
administration of the crown ethers (28-crown-8, 22-crown-6, 31-crown-9,
28-crown-8) in doses of 0.5-30 mg/kg 3 min prior to intravenous strophanthin
(15 mg/kg) delayed the onset of arrhythmia and ventricular fibrillation due
to the glycoside and, in some cases, prevented death. In vitro studies with
one of the compounds (1,6,9,12,17,20-hexaoxacyclodokasan-2,5,13,16-tetraone)
showed delay of positive inotropic effects due to strophanthin, low sodium
(5 mM) Ringer-Locke solution, or K-free Ringer-Locke solution. Polargraphic
studies with myocardial mitochondria showed that the crown ethers had no effect
on energy metabolism, nor did they affect intracellular levels of calcium. They
did, however, inhibit passive calcium influx into the myocytes. Figures 2;
references 14: 8 Russian, 6 Western.
[2040-12172]

PHYSIOLOGY

ALCOHOL EFFECTS ON BRAIN

Moscow PRAVDA in Russian 19 Aug 85 p 7

IGNATENKO, M.

[Abstract] This article presents the results of an interview with corresponding member of the Academy of Medical Sciences, USSR, I. Anokhina and Professor E. Kostandov following a symposium entitled 'Biological Principles of Alcoholism,' held in Kiev and involving scientists from the Soviet Union, Bulgaria, Hungary, East Germany, Poland, Czechoslovakia, Finland, Yugoslavia, India, West Germany, the USA and Switzerland. The symposium discussed the development of the mental, then physical dependence on alcohol, the mechanisms by which its victims are attracted to alcohol. Alcohol has been found to greatly increase the production of catecholamine mediators in the synaptic gap, the very substances which regulate our emotional state. Repeated drinking can cause overproduction and an excess of dopamine, causing physical symptoms of alcoholism. Suppression of the right cerebral hemisphere can cause euphoria or depression. A test is described in which a patient is exposed to a sequence of words on a screen, most of which are neutral, and to some other words which have emotional significance for the patient at the moment. If the words are flashed on the screen quickly, the patient cannot actually read them, but the brain reacts to them. Sensors determine the reaction of the patient to neutral words as well as words like 'vodka,' helping to diagnose potential alcoholics by their subconscious attraction to alcohol.

[2023-6508]

PHYSIOLOGICAL ADAPTATION EXPERIMENT IN KARA-KUMY DESERT

Moscow MEDITSINSKAYA GAZETA in Russian 16 Aug 85 p 4

FAYBISHENKO, Yu.

[Abstract] The article reports on a physiological adaptation experiment which was being conducted in the Kara-Kumy Desert, about 50 kilometers south of Ashkhabad, by associates of the USSR Ministry of Health Institute of Medical-Biological Problems, and the Turkmen Academy of Sciences' Institute of the Physiology and Experimental Pathology of the Arid Zone. A group of 12 subjects was taking part in the experiment. The group consisted of six Ashkhabad

residents under the direction of Candidate of Medical Sciences A. I. Freynk, and six Moscow residents.

In a conversation shortly before the expedition left Moscow for Ashkhabad, Doctor of Medical Sciences Vitaliy Georgiyevich Volovich, senior science associate of the Institute of Medical-Biological Problems and a director of the experiment, discussed the goals and aspects of the study. For the first time, residents of Central Asia who are acclimatized to high temperatures were taking part in such an experiment simultaneously with residents of the central Russian republic who are not accustomed to desert conditions, according to Volovich. The Russian and Asian groups' adaptability to desert conditions was to be compared. An unusually wide range of studies reportedly were to be conducted under the direction of Candidate of Medical Sciences M. S. Belakovskiy, an associate of the medical-biological institute. This program was to include physical, biological and psychological research, and especially biochemical studies aimed at gaining detailed knowledge of processes which take place in the body from the effect of stress conditions. Among the participants in the drafting of the program were F. F. Sultanov, academician-secretary of the Turkmen Academy of Sciences; academician O. G. Gazenko, director of the medical-biological institute; and Candidate of Medical Sciences Yu. A. Senkevich, head of a department of this institute.

Commenting on the program, Volovich related that it called for the subjects to drink 1,000 milliliters of water a day, and that their daily food ration of 700 kilocalories was to be in the form of 150 grams of caramels with ascorbic acid and other special additives in them. Two groups consisting of three Moscow and three Ashkhabad residents were to spend three days each inside a tent. There was to be continuous psychophysiological monitoring of the subjects.

FTD/SNAP
CSO: 1840/2078

BACKGROUND OF PRIZE-NOMINATED WORK ON BRAIN PHYSIOLOGY

JPRS-UBB-85-024

22 October 1985

Moscow IZVESTIYA in Russian 11 Aug 85 p 3

MANUCHAROVA, Ye., correspondent

[Abstract] This lengthy article describes the background of the cycle of works that has been nominated for the 1985 USSR State Prize under the title "Fundamental Research of the Physiology of the Human Brain". The lead researcher of the group of scientists who contributed to this cycle is academician Natal'ya Petrovna Bekhtereva, director of the USSR Academy of Medical Sciences' Institute of Experimental Medicine. The other authors named in the prize nomination are identified.

The article characterizes the body of information that has been amassed from the study of mechanisms of nerve signals using implanted electrodes. Years of study, by Bekhtereva and her school of physiologists, of information on biocurrents derived by means of electrodes have revealed mechanisms and laws of brain function, leading to a general theory of 'rigid and flexible elements' of the brain.

This school of physiology has given birth to a new direction in science dealing with the neurophysiology of thought processes. It is said to have implications for the development of fundamentally new types of computers. The theoretical work has been represented in a number of monographs, and a new one titled "Neurophysiological Mechanisms of Thought" (Neyrofiziologicheskiye mekhanizmy myshleniya) is due for publication.

The article also mentions new medical therapy using implanted electrodes that is being explored to correct nerve damage that was previously thought to be hopeless in the clinic of Bekhtereva's institute. Operations reportedly are being performed by the clinic's chief surgeon, F. Gurchin, with the assistance of Prof. V. Khil'ko, head of the neurosurgery clinic of the Military Medical Academy, and Candidate of Sciences S. Medvedev, an associate of the Computer Center of the USSR Academy of Sciences.

FTD/SNAP

CSO: 1840/2078

UDC 612.766.1:612.127.2

OPTIMAL ARTERIOVENOUS DIFFERENCE OF OXYGEN CONCENTRATION UPON PHYSICAL EXERCISE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 283, No 1, Jul 85 (manuscript received 2 Jan 85) pp 222-224

OBRAZTSOV, I.F., academician, KHANIN, M. A. and BUKHAROV, I.B., Moscow Aviation Technologic Institute imeni K.E. Tsiolkovskiy

[Abstract] Mathematical modelling of the dependence of arteriovenous difference of oxygen concentration on the mechanical force developed by the skeletal muscles, based on an energetically extremal criterion previously used successfully for quantitative description of the functional state of the oxygen transport system under normal conditions and in pathology, in the state of rest, is described and discussed. There is a satisfactory correspondence between experimental and theoretical results of determination of the dependence of optimal arteriovenous differences of oxygen concentration on the mechanical force, developed by the skeletal muscles. Existence of an optimal concentration of oxygen in the venous blood was attributed to the possibility of the decrease of blood expenditure and pulmonary ventilation with reduction of oxygen in the venous blood, which reduces the force required of the heart and respiratory muscles. This is accompanied by increased energy loss in the skeletal muscles due to the increased role of anaerobic metabolism. Competition of these factors determines the optimal concentration of oxygen in the venous blood.

Figure 1; references 9: 1 Russian, 8 Western.

[1988-2791]

UDC 632.938.2

IMMUNIZATION OF PLANTS WITH AID OF BIOGENIC INDUCTOR OF PROTECTIVE REACTIONS OF SYSTEMIC EFFECT

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 283, No 1, Jul 85 (manuscript received 28 Nov 84) pp 253-256

METLITSKIY, L.V. (deceased), OZERETSKOVSKAYA, O.L., CHALOVA, L.I., IVANYUK, V.G., CHALENKO, G.I. and PLATONOVA, T.A., Institute of Biochemistry imeni A.N. Bakh, USSR Academy of Sciences, Moscow; Belorussian Scientific Research Institute of Potato Growing and Fruit and Vegetable Growing, Samokhvalovichy, Minsk Oblast

[Abstract] A phytoalexin (FA) elicitor, which meets all requirements for practical use for plant immunization, was isolated from potato phytofluorosis pathogen. It is a lipoglycoprotein complex (LGP-complex) containing 57-59 percent lipid, 34-38 percent carbohydrates and 5-7 percent proteins. The LGP-complex has non-specific effect and is present in all races of parasite studied (7) regardless of the presence of genes of virulence in them and produces protective action in all varieties of potato studied (10) regardless of the presence of genes of photoresistance. Application of 100 micrograms/ml to potato slices caused FA accumulation in fungitoxic concentrations accompanied

by necrosis of the cells. There are reports in the literature concerning the danger that immunization of plants may reduce yield because of diversion of part of the energy reserves of the cell to induction of resistance. Experiments, using the LGP-complex on three varieties of potato, showed that immunization promoted a 10-27 percent increase in yield. Wide-scale use of immunization of plants requires development of a biotechnology for industrial production of biogenic inductors which meet the needs of present-day agriculture. Figures 2; references 11: 5 Russian, 6 Western.
[1988-2791]

PSYCHOLOGY

UDC 15:001(100)

IMAGE PROBLEM IN PSYCHOLOGY

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 6, Jun 85 pp 85-92

LOMGV, B.F.

[Abstract] This is a rewrite of a paper presented at the World Psychological Congress in Acapulco, in September 1984. The problem of image is one of the more important problems in psychology. Soviet psychologists claim that all psychological phenomena, including the image, are subjective reflections of objective reality; this subjective reflection is connected with information transformation, which is a direct function of the image carrier. Psychophysical subjectivity as a characteristic of psychological reflection is related to physical properties of the reflected object. Social psychology has a different approach: subjectivity is viewed through an analysis of the relationship of an individual to social events. Subjectivity of the image shows up as an overall characteristic of a subject in any act: a summary of all experiences of the subject. Three principal levels of psychological reflection can be identified: sensory-perceptive, reflective and rationalized. The processes are polydimensional and are developed in discrete stages. They are not instantaneous. The second level of psychological reflection includes image memory, perception, sequential images, hypnotic images--all secondary impressions. The final aspect is image expression, verbalization, transmission to other subjects. At this stage, the image is created with a goal and full awareness. The image is not a mirror copy of the event in any of these steps. References: 16: 14 Russian, 2 Western.

[1840-7813]

PUBLIC HEALTH

ALLEGATION OF INCOMPETENT MEDICAL SERVICE IN USSR

Moscow SOVETSKAYA ROSSIYA in Russian 21 Jul 85 p 5

[Article by A. Bogomolov: "At the Level of a Quack"]

[Text] An article which appeared recently in the American magazine NEWSWEEK was called "Soviet Public Health: A Crisis." The author cannot ignore our achievements in this area: free medical services and a widespread network of polyclinics and outpatient clinics. He also noted that "house calls by physicians, a service whose absence is often cause for complaint in the West, is a widespread practice in the Soviet Union." On this note, the "happy beginning" ends and the "sad ending" begins. It appears that "the whole system does not work", incidence of hepatitis, lung infections and cholera is on the increase in the nation and patients are compelled to turn to quacks. It is even bad that treatment is free: because of this, "compared to Americans, most Russians know much less about how to help themselves."

A correspondent from SOVETSKAYA ROSSIYA asked the USSR Deputy of the Minister of Health, A. G. Safonov, to comment on all of this.

"The free nature of medical services in our country reinforces its general availability. In the USSR there are some 26 thousand hospitals and more than 36 thousand outpatient and preventive medical institutions. Thus the "radius of operation" of a polyclinic is no more than 3-4 kilometers. They have everything necessary for examining and treating patients. And the people know this. For every person in the USSR, there are 11.0 visits to outpatient clinics and polyclinics annually, 40 percent of which are for preventive purposes. As a result, the number of early diagnoses of cardiovascular, oncological, lung, endocrine and other diseases is increasing. As for hepatitis, cholera and lung disease, about which the American magazine writes, the following figures can be given: in 1984 the number of cases of hepatitis decreased by 24 percent compared to 1983 and since the outbreak in the summer of 1970 cholera has practically disappeared. As far as influenza and other adenoviral infections are concerned, they are linked to the general epidemiological situation on the planet. We have specific, effective means for fighting them. Inflammation of the lungs constitutes a significant portion of illnesses as a whole."

"Aleksei Georgievich, NEWSWEEK also writes that 'the Soviets are only just beginning to practice preventive medicine.' In this connection the program of universal prophylactic medical examination is mentioned which the magazine calls 'a typically bureaucratic method.' What can be said about this?"

"We have been doing a great deal of preventive work for a long time. It is the general direction of Soviet public health. Any doctor in our country could not conceive of his work without prevention. Some 120 million people now have periodic preventive checkups and more than 60 million are under dispensary observation. This is guaranteed by a widespread network of medical institutions and the presence of an army of physicians more than a million strong. There are more than three million mid-level medical personnel working in this country. There is an increasing amount of technical equipment in Soviet public health. All of this provides a real basis for the transition to annual prophylactic medical examinations for the whole population. This is not the beginning but the natural continuation of a process which has been going on for a long time. Prophylactic medical examination is a very effective method of preserving and improving the health of the Soviet people, which only an extremely biased person could call "bureaucratic".

Well, there you have a direct answer. Our public health system does have its problems, but criticism should be just that and not unsubstantiated malice. However, objectivity cannot be expected of such magazines. They have a very different goal in mind, to blacken and discredit the achievements of socialism.

This is what Cullen writes at the end of his article: "The Soviets come up against a multitude of problems, but their experience is a lesson to those governments who want to have a free system of public health along Communist lines."

Here you have it in a nutshell. This whole flood of fabrications is necessary only to hide the successes of the Soviet public health system from the people of capitalist countries and to prevent the developing countries from turning their attention to the Soviet experience. Doing this is not easy, so they have to invent quack diagnoses.

12793
CSO: 1840/385

SOVIET CITIZENS REQUIRED TO PAY FOR MEDICAL AGENTS

Moscow ARGUMENTY I FAKTY in Russian 4 Jun 85 p 8

[Article: "Questions and Answers"]

[Text] We say that medical care in the USSR is free but we must pay for medicines. How do you account for this? N. Fadeyev, Rubtsovsk, Altai Kray.

We all agree that you must visit a physician before you buy medicine. If necessary, treatment includes X-rays, electrocardiograms and analyses. So, you see our treatment does not include only the use of medicine. Frequently, it involves a course of various outpatient procedures.

We do not pay a single kopeck for the simplest dressing in a polyclinic nor for the most complicated surgery in a major specialized hospital. When we require "emergency" medical aid, we know that the physician upon arrival will not be interested in whether or not the patient will pay but will provide any emergency care required.

We consider all of this to be entirely proper. However, we must not forget that free medical care for us does not mean, by any means, that such care does not cost society.

Judge for yourself. One visit to a physician in a polyclinic costs the state 1 ruble and 20 kopecks, on the average, and there are more than 3 billion such visits per annum. Certainly the reader will readily realize the overall cost of this.

Consider also that every year more than 67 million persons (data for 1983) are hospitalized for 15 or 16 days, on the average. Hospitalization of 1 patient costs 6-7 rubles a day.

We shall add another fact. The cost of a single hospital bed is 2,216 rubles per annum, for example. Now, we shall multiply this sum by 3,555,400, the total number of hospital beds in the country. The figure is very impressive.

We shall give another example. An "emergency call" costs the state 6-7 rubles, on the average and there are 37.5 million such calls a year, on the average.

We pay only for medicine and, quite often, we do not pay for it. Everyone knows that, if a person is hospitalized, his care costs him nothing and this includes the cost of medicine used.

In addition to this, we have, in our country, an increasing number of diseases (they now include nearly 20 diseases with major ones being diabetes mellitus, tuberculosis, rheumatoid arthritis and others) for treatment of which the patient receives medicine free, upon prescription by a physician.

Children under the age of 1 year and disabled World War II veterans do not pay for their medicine. In addition to this, since 1 May of this year, all veterans receive a 50 percent discount on the cost of their medicine. In November, this benefit will be extended to all pensioners who receive minimum pensions.

It is important to note also that prices for medicine in the Soviet Union are constantly being reduced, in contrast to the situation existing in capitalist countries. For example, in the past year, prices of 58 kinds of medicine were reduced considerably.

Statistics show that the Soviet citizen pays 10 rubles and 82 kopecks a year for medicine, on the average.

You must agree that this sum is so small in comparison with state expenditures on our medical treatment that it is preposterous for us to even speak about our own costs for medical care.

The great significance of paid medical care will be well understood, it seems, if we consider costs for medical service in the capitalist world. For instance, according to data in the American journal "U.S. News and World Report", a 1-day stay in a ward costs the patient \$190. On top of this, X-rays, tests, cardiograms and surgery add more and more and more dollars in costs. We also notice that prices for medicine and medical services are constantly increasing there.

Thus, while Americans spent 4.3 billion dollars to purchase medicine in 1970, they spent nearly 13 billion dollars for these purposes in 1983. Such a sum, as we see clearly, is staggering. Yet, this is a pittance in comparison with the amount Americans pay for medical services as a whole. A Los Angeles resident, L. Velikes asserts, in an article in the "U.S. News and World Report", that "the average American must work all year to pay for a 2-week stay in the hospital".

We find this difficult to believe. Such is the cost of care in capitalist countries. Our personal expenditures on medicine cannot even begin to compare with the costs of medical care for persons in the West.

2791
CSO: 1840/1984

AIDS DIAGNOSTIC TEST SOLD TO USSR

Rotterdam NRD HANDELSBLAD in Duth 27 Jul 85 p 1

[Raymond Van den Boogaard dispatch: "Organon-Teknika to Supply Moscow with AIDS Tests"]

[Text] The Soviet Union has "signed with Organon-Teknika a major contract for the supply of a test to diagnose AIDS," a fatal viral disease which chiefly occurs among homosexuals.

Western journalists have learned this from reliable sources in Moscow. The contract, which is reported to have been reached with great speed, follows two recent publications in the Soviet press in which Russian citizens were for the first time informed of the existence of AIDS, called SPID in its Russian abbreviation.

Unlike the case of China, there have hitherto been no reports of cases in the Soviet Union. Observers believe that import of the test--developed from the AIDS virus and which, according to Organon, establishes "with 99 percent certainty" whether someone has AIDS--is partly intended for research. The existence of such research in the Soviet Union was revealed recently by immunologist R. Petrov, a member of the Academy of Medical Sciences, in an article in the daily MOSKOVSKAYA PRAVDA.

Neither of the newspaper articles which appeared last week told the Soviet reader clearly that AIDS is transmitted through homosexual contact, among other channels. Petrov, for example, said that AIDS chiefly occurs among drug addicts who inject themselves with dirty needles and among those who "surrender themselves to a disorderly life and perversities." Homosexuality is an official taboo in the Soviet Union; sex between men is punishable under law.

Another possible reason for import of Organon's test, observers think, is the international youth festival which begins today and for which 22,000 participants from 150 countries arrived this week. This same festival has also made a tiny breach in the Soviet taboo surrounding homosexuality because of the fact that a number of Western delegations include official representatives of gay groups.

CSO: 1840/1999

MOTHER AND CHILD CARE IN KIRGHIZ SSR

Frunze SOVETSKAYA KIRGIZIYA in Russian 27 Jun 85 p 4

[Article by A. Ilin, director of the Institute of Obstetrics and Pediatrics, doctor of medical sciences, professor, under the rubric "Health Service": "To Grow Healthy and Happy"]

[Excerpts] A high infant mortality rate is due primarily to social causes. [The author claims that] twice as many babies in American poor families die before they are a year old as they do in rich families. Economic worries and exhausting work undermine the health of the pregnant woman and have a harmful effect on the health of her fetus.

We can state with legitimate pride that there is no other country in the world that has given as much attention to the health care of children as [the USSR]. The CPSU Program states: "The party considers bringing up a physically strong young generation, starting at the very earliest age, in a harmonious development of physical and spiritual strengths one of its most important tasks."

The multi-child family is characteristic of our republic [Kirgizia]. The state pays a bonus for raising children, provides their nutrition from milk kitchens, gives them the first places in kindergartens and nurseries and provides constant preventive medical care for multi-child families.

The Kirghiz Scientific Research Institute of Obstetrics and Pediatrics is conducting research jointly with corresponding departments of the medical institute on key questions of mother and child care. As a result, procedural recommendations have been developed which are intended to further increase the level of service to women and children living in rural areas, under high altitude conditions, etc. The development of three variants of the pediatric lactic acid Biolact is the practical realization of priority theoretical studies conducted at the institute. Centralized industrial production of its enzymes made it possible to organize delivery of the product even in the most remote rural districts. Children's nutrition in Naryn Oblast has been studied. Food rations were developed for them, taking into account national characteristics and local conditions. Studies of bronchopulmonary diseases in children are being successfully carried out at the institute; procedural recommendations for the early diagnosis and treatment of these diseases are being instituted.

12262

CSO: 1840/1976

UDC 616.1-053.81-084

HEALTHY LIFE STYLE AS BASIS OF PROPHYLAXIS OF CARDIO-VASCULAR DISEASES
AMONG ADOLESCENTS

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 7, Jul 85 (manuscript
received 5 Feb 85) pp 13-16

KARASEV, A. V., candidate of medical sciences, AGAPOV, A. A., PROKHOROV, A. V.,
LEVINA, I. I., MASLENNIKOVA, G. Ya., ARESHEV, G. P. and POLESSKIY, V. A.,
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[Abstract] Healthy life style should be viewed as an active, directed behavior
pattern assuring long term preservation of psychologic and physical health,
along with increased adaptability of body to external requirements. Cardio-
vascular diseases are presently the leading cause of mortality and disability
of adult population, slowly creeping in the direction of the youth. According
to available data, the frequency of ischemic heart disease in males 20-29
years old is 2%. The risk factors, however, began developing many years before
that age. Epidemiologic studies indicated the following among the male teenagers:
increased arterial pressure--9-15%; obesity--6.5-15%; smoking--7.4% at 7 years
of age and 44.3% at 16. In addition to the current methods of youth education,
it was recommended to employ TV and video techniques stressing sport activities
in many of its forms, going beyond the competitive team efforts into individual
sports. References 6: 5 Russian, 1 Western.
[2005-7813]

MACHINE DESIGNS

Baku BAKINSKIY RABOCHIY in Russian 9 Aug 85 p 4

MAGERRAMOV, A., Chief, Republic Administration of Medical Technology,
Azerbaijan Ministry of Health

[Abstract] Improvements in the supply of complex diagnostic and therapeutic
apparatus at medical institutions throughout the republic have made problems of
better utilization of the equipment increasingly pressing. The effectiveness
of utilization of complex equipment depends not only on its conditions but

also on the ability of personnel to use it. Some physicians and other medical personnel do not know or want to know the proper way to use new equipment. This is one reason for slow introduction of medical equipment such as capillariscopes, cardiac rhythm recording devices, echotomoscopes, complex analyzers and other devices. Radical measures are required, including the organization of a departmental permanent course on operation of medical equipment at the Institute for Advanced Training of Physicians imeni Aliyev.
[2024-6508]

NEED TO TRAVEL TO CITY FOR MEDICAL CARE ALLEVIATED

Tallinn SOVETSKAYA ESTONIYA in Russian 6 Aug 85 p 3

VALDMA, R.

[Abstract] The advantages of availability of a local outpatient clinic in Yuri village to serve 2500 adults and 1100 children are described. The clinic was constructed at a cost of 400,000 Rubles. It has a supervisory medical officer, Yuri Kallon, a dentist, a midwife and a pharmacist. Once weekly, patients are seen by a gynecologist and gastroenterologist. There is a pediatric unit and on-site drug dispensary. A need exists for a masseur and a physical therapist. This unit is not unique; other such units (which make trips to metropolitan areas to obtain needed medical assistance) exist in Karkis-Nuya, Loo, Paydesh regional center "Estoniya" and in Kyayna; more are being planned.
[2049-7813]

CONCERN FOR HEALTH OF WORKERS

Moscow TRUD in Russian 13 Jul 85 p 2

BIRYUKOVA, A.P., deputy chairman, All-Union Central Council of Trade Unions

[Abstract] Assessment of the health status of the Soviet work force shows considerable progress in recent decades, much of it reflecting the care and concern of the Party and the government for the welfare of the Soviet people. For example, during the first four years of the 11th Five-Year Plan the loss of work days per 100 workers due to illness decreased by 22 days in comparison with an equivalent timeframe for the 10th Five-Year Plan. However, despite successes there are reasons for concern. While health status indicators in the Kemerovo Oblast continue to improve, they continue to deteriorate in the adjacent Novosibirsk Oblast which has virtually identical climatic and industrial conditions. Many other cases could be cited, and all of them point to shortcomings in administration and planning of health programs and facilities, as well as to inadequate diligence and unprofessional attitudes of the medical personnel. In Karaganda polyclinics, for example, medical specialists have gotten into the habit of seeing patients for only one hour a day, with appointments to be made two or three weeks ahead of time. In Tyumen, physicians

have decided to call it a day five hours before official quitting time. To overcome such laxity and reassure the public, the appropriate Party, governmental and trade union officials will have to make a concerted effort in improving health care delivery in their regions.
[379-12172]

STATE OF MEDICAL CARE AT VILLAGE LEVEL

Moscow PRAVDA in Russian 11 Jul 85 p 3

SLAVOLYUBOVA, L.

[Abstract] This article, entitled "Sorrows of Doctor Krylov", which describes the present status of medical care at the village level, based on observations made in Kharovskiy Rayon while accompanied by Dr. Krylov and on Krylov's description of the situation, is the first of 3 reports included in the expedition "Health" project, aimed at defining the level of medical care in the village, in workers' settlements and in urban areas. The medical situation described in this report is typified by acute shortages of physicians, hospitals and medical and hospital equipment. These conditions are aggravated by long distances between medical aid institutions, transportation shortages and poor roads. Hospital construction is lagging for many reasons. Dr. Krylov discusses problems facing medical aid posts and uchastok hospitals in the attempt to improve medical care. Problems facing the central rayon hospital are also discussed and the plight of medical personnel in this area is discussed. Poor telephone communication facilities complicate all of these problems.
[386-2791]

RADIATION BIOLOGY

UDC 577.3:539.12.4

LEVELS OF ARTIFICIAL RADIONUCLIDES IN PERSONNEL SERVICING MR REACTORS

Moscow ATOMNAYA ENERGIYA in Russian Vol 58, No 6, Jun 85 (manuscript received 10 Oct 84) pp 460-463

MOISEYEV, A.A., STOLYAROV, V.P., POLUNIN, V.P., DRABKINA, I.B. and FISHEVSKIY, V.K.

[Abstract] A study was conducted at the end of 1983 and beginning of 1984 to monitor the levels of artificial radionuclides in personnel servicing the MR [sic] reactor at the Institute of Atomic Energy imeni I.V. Kurchatov. The studies, conducted with the SICH-2.2 spectrometer, were carried out on 222 subjects. The data showed that Cs-134, CS-137 and Co-60, in 92% of the cases, did not exceed 1/400th of the permissible human level, and, that, only in isolated cases, did Cs-137 approach 1/100th of that level, and Co-60 1/300th of that concentration. In addition, in only a few cases were insignificant trace elements of Zr-95m, Ag-110m and some other radionuclides detected. Figures 5.
[1978-12172]

UDC: 541:183:615.279

INFLUENCE OF ULTRAVIOLET IRRADIATION OF BLOOD ON PRODUCTS OF FREE RADICAL OXIDATION AND ANTIOXIDANT SYSTEM OF THE ORGANISM

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR: SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 7, Jul 85 (manuscript received 17 Jul 84) pp 79-82

TERNOVOY, K.S., Academician, Ukrainian Academy of Sciences, BUTYLIN, Yu.P., SHVETS, D.I., STRELKO, V.V., SUPRUNENKO, K.A., SAKUN, Yu.M., POMASHKO, O.A. and BELODED, A.A.

[Abstract] Free radicals can be considered possible substances for pathogenetic therapy, particularly by the promising method of ultraviolet irradiation of the blood. The authors compared the dynamics of changes in free radicals and some components of the blood antioxidant system in patients with ischemic

heart disease. Analyzing the signals recorded in the blood of patients with various diseases after ultraviolet blood irradiation therapy, three groups of patients were distinguished: those in which the content of free radical products was significantly reduced after the therapy, those in which no change was observed in the structure of radicals or their content, and those in which after irradiation of the blood by UV light radicals appeared, the structure of which differed significantly from the structure of EPR signals in the first two groups. The data from analysis of the free radical products in the blood of these groups of patients were compared with the dynamics of indices of the antioxidant system and clinical data. It was concluded that the quantity of radical products in the blood and the nature of the behavior of these products under the influence of UV light or medication can be used in the diagnosis of the nature and phase of diseases, as well as effective regulation of antioxidant homeostasis of the organism and to develop criteria to determine the degree of detoxication of the organism from peroxide-type metabolic products. Figure 1; references 14: 12 Russian, 2 Western.
[2032-6508]

CONFERENCES

INTERNATIONAL PHARMACOLOGY MEETING IN BUDAPEST

Moscow TASS in English 1840 GMT 28 Aug 85

[Text] Budapest August 28 TASS--Specialists from over 20 countries, including the Soviet Union, are attending an international scientific conference on pharmacology, which opened here. They are to examine the results of the work carried out by scientists to develop effective medical drugs and medicinal preparations, to discuss the questions of furthering cooperation in this area and to visit a number of large-scale plants of the Hungarian pharmaceutical industry.

CSO: 1840/2077

HEART SURGERY SYMPOSIUM

Yerevan KOMMUNIST in Russian 7 Jul 85 p 3

MUSAYELYAN, V.

[Abstract] Excerpts from correspondent Musayelyan's conversations with participants in the 11th annual symposium on surgical treatment of congenital and acquired heart defects are presented. The symposium convened at the Yerevan Branch of the All-Union Scientific Center of Surgery, USSR Academy of Medical Sciences. Professor V. Chekanov, Coordinator of the problem topic, "Surgical Treatment of Diseases of the Heart and Vessels" within the Council For Mutual Economic Aid Countries, reported that collaboration of scientists from these countries has improved treatment of congenital and acquired heart diseases in young children and critically-ill neonates. Exchange of experience has played a major role in these advances. Chavdar Dragoychev, director of the Institute of Cardiovascular Diseases (Bulgaria), emphasized that this is the first time that research of scientists from an entire group of countries has been coordinated at a conference with the result that much duplication of data has been excluded. Milan Shamenek, director of the Center for Pediatric Cardiology and Cardiosurgery (Czechoslovakia), briefly described some areas in which treatment of congenital and acquired heart defects in children and neonates has improved significantly and mentions some positive changes in mortality figures in these areas. Professor A. Mikayelyan, director of YeF VNTsKh (Yerevan branch of the All-Union Scientific Center of Surgery), described the great increase in the number of heart operations, the high rate of success achieved in surgical treatment of congenital and acquired heart defects in children and the application of knowledge gained in these operations to treatment of other diseases. Conference participants agreed that surgical treatment of congenital and acquired heart defects must be carried out in the early period of the disease before irreversible changes occur in the heart.

[1986-2791]

MISCELLANEOUS

PLAGIARISM ALLEGATION AGAINST SKLIFOSOVSKIY INSTITUTE DIRECTOR

Moscow SOVETSKAYA ROSSIYA in Russian 13 Jul 85 p 2

[Editorial Report] The 13 July 1985 first edition [of source] carries on page 2 a 2500-word report by M. Kushtapin about complaints from a urologist, Candidate of Medical Sciences Ye. M. Ustimenko, that Prof B. D. Komarov, director of Moscow's N. V. Sklifosovskiy Scientific Research Institute of First Aid, "regularly uses his official position to obtain coauthorship of the scientific works of the institute's employees." Kushtapin cites numerous examples provided by Ustimenko which prove that "corresponding member of the USSR Academy of Medical Sciences B. D. Komarov has acquired his scientific baggage mostly from other people's pens." However, Kushtapin continues, all the organizations and officials to whom Ustimenko has complained have in fact claimed that Komarov "has the right to rewrite other people's articles in his own books, to compel his subordinates to agree to coauthorship and to acquire authorship and royalties from any work by any institute employee that he chooses." After a fruitless complaint to the Academy of Medical Sciences, Kushtapin says, "Ye. M. Ustimenko wrote to the RSFSR Ministry of Health, the prosecutor's office, the USSR Higher Certification Commission, and Party organs. The same result again--Professor Komarov has the right..that is also the belief of Ye. G. Izyumov, Deputy Main Administration Chief of the RSFSR Ministry of Health, of A. V. Zaytsev, prosecutor of Moscow's Dzerzhinskiy rayon, the RSFSR Health Ministry Commission comprising Professors V. I. Pronin and Yu. A. Nesterenko, and Candidate of Medical Sciences V. V. Galkin, of A. N. Omelchenko, deputy chief of the city prosecutor's office investigation administration, and of the USSR Academy of Medical Sciences All-Union Scientific Center for Surgery's Commission chaired by Professor O.S. Belorусov."

Kushtapin then describes how Ustimenko was denied promotion and ostracized by his colleagues for refusing to accept Komarov as coauthor of two monographs. "Ye. M. Ustimenko was branded as a slanderer and expelled from the institute," although this involved disbanding the institute's urology department which, in the opinion of authorities cited by Kushtapin is "vitally necessary" to a first aid institute. "How many times we have put this question to the director of the Sklifosovskiy Institute, but in vain," Kushtapin complains, concluding that Professor Komarov "is concerned least of all for common sense, the opinions of specialists, and the interests of patients."

CSO: 1840/2000

END